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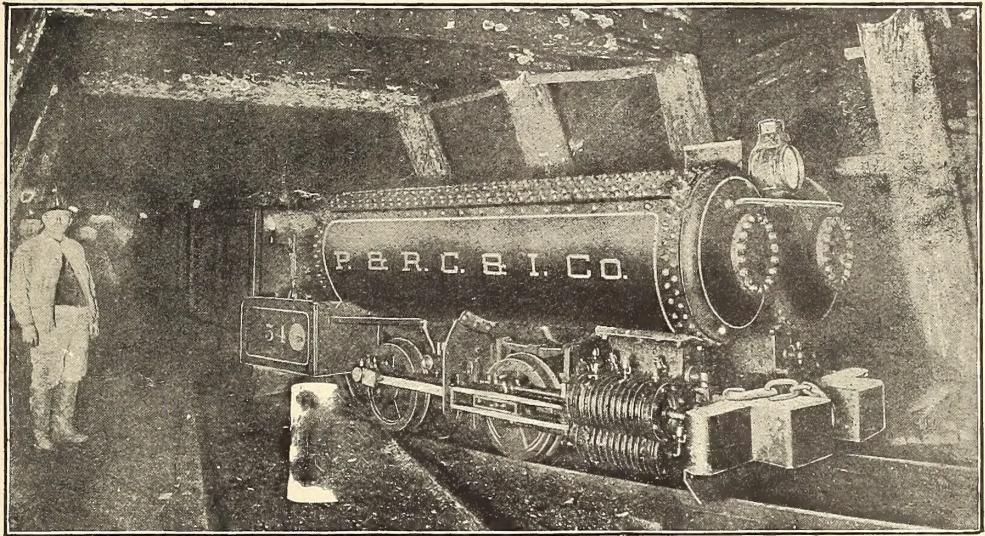




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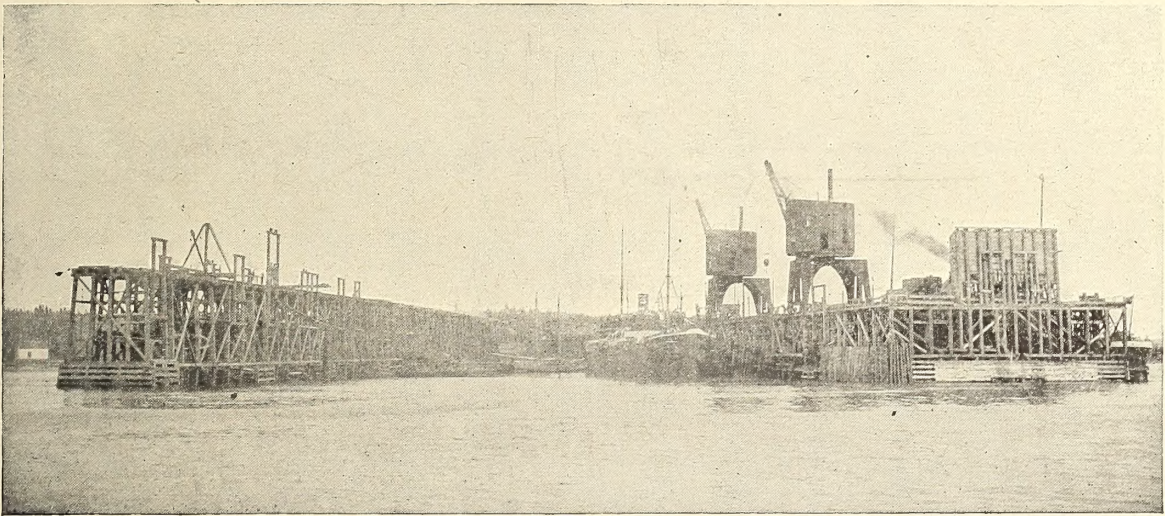
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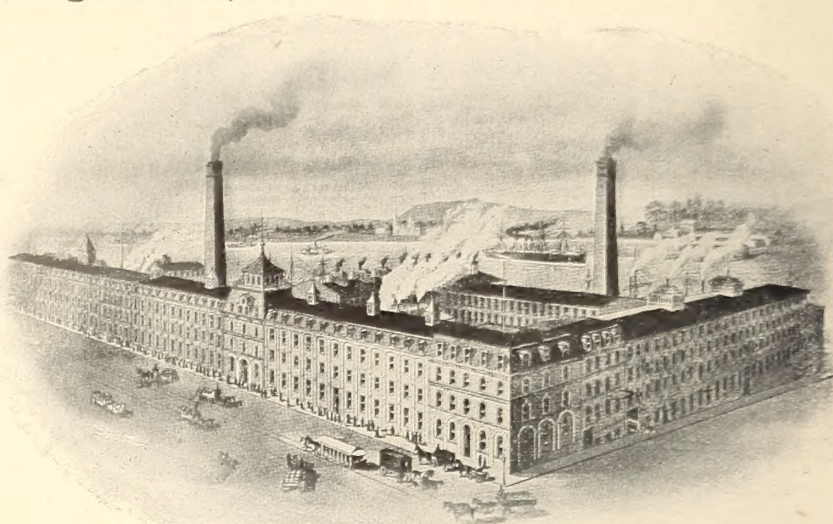
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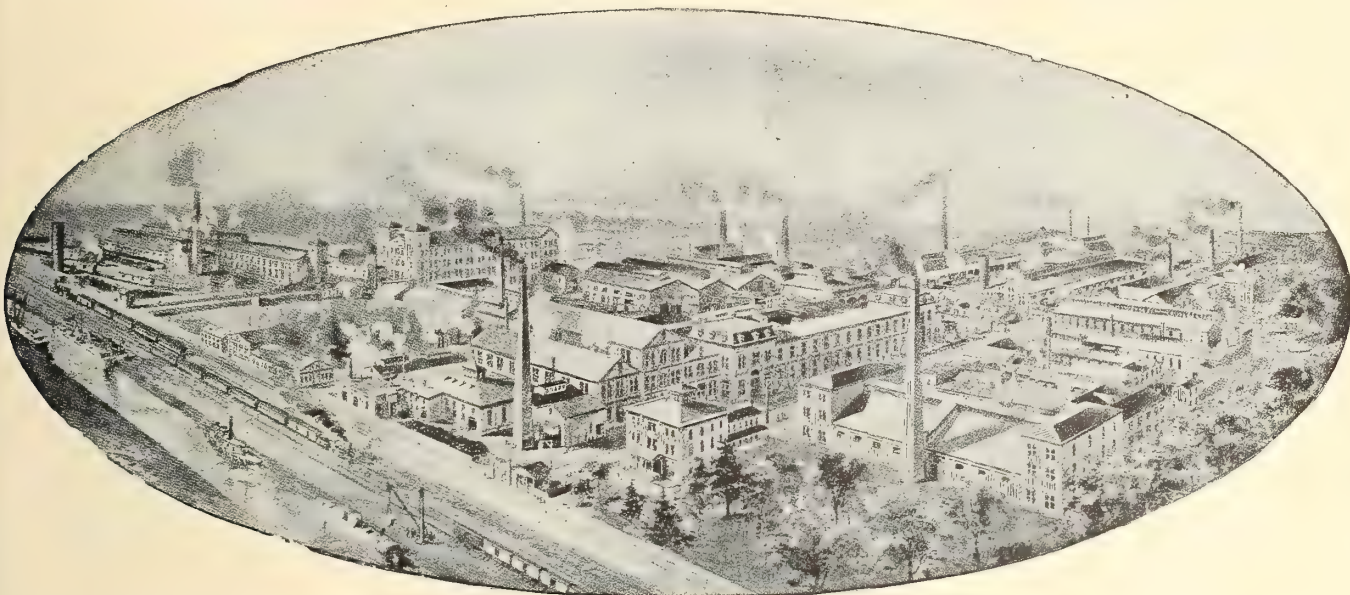
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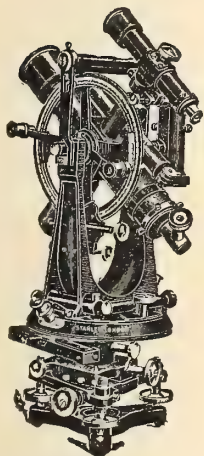


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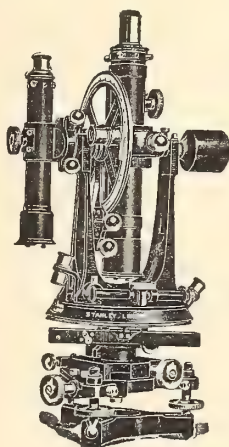
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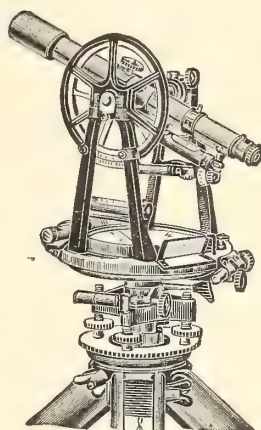
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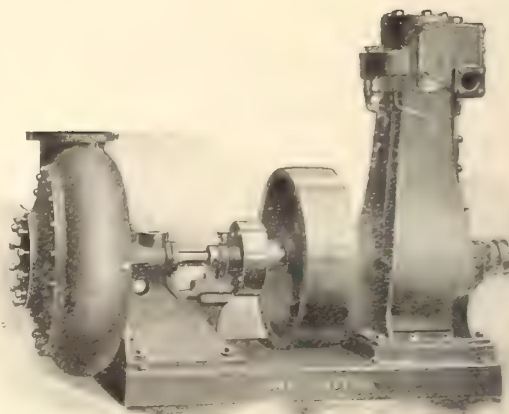
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A Calendar giving full information, and including a list showing the positions held by graduates, sent on application.

A. T. LAING, Registrar.

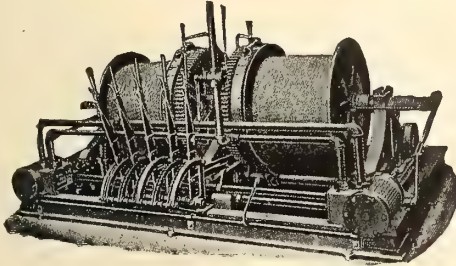


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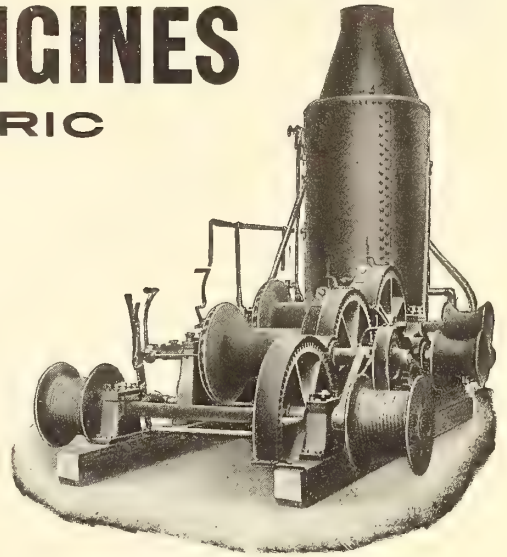
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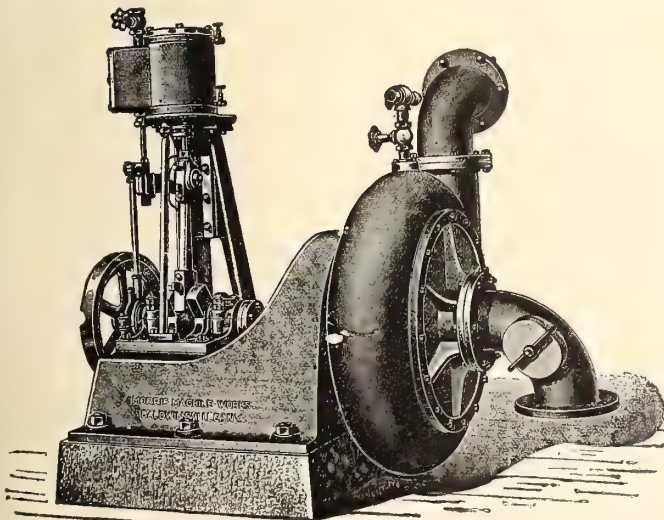
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Superior to all others for exploding any make of dynamite or blasting powder. Each Fuse folded separately and packed in neat paper boxes of 50 each. All tested and warranted. Single and double strength with any length of wires.

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## JUDICIAL SALE

By Auction of Mining Property in the Rainy River District, Ontario, Canada, and in Cochise County, State of Arizona, and Eldorado County, in the State of California, in the United States of America.

PURSUANT to the Winding Up Order in the matter of the **Twentieth Century Mining Company, Limited**, there will be offered for sale with the approbation of J. A. McAndrew, Esquire, Official Referee, by Messrs. Suckling & Company, at their Auction Rooms, 66-68 Wellington Street, West, in the City of Toronto, at Twelve o'clock Noon, on Saturday, the 16th day of September, A.D. 1905, the following Mining Properties, and License:—

**PARCEL 1.** Mining locations in Manitou Lake region, District of Rainy River, Province of Ontario, Canada; being H.P. 398, fifty-four acres; H. W. 44, forty-five acres; H. W. 47, forty-six acres; H. W. 204, one hundred and thirty-five acres (total—two hundred and seventy acres); together with Shaft House, Blacksmith Shop, Assay Office, Stables, Boarding Camp, Ice House, Store House, Manager's Residence Oil House, Miners' Dwelling, Power House and Warehouse, together with a Diamond Drill.

**PARCEL 2.** United States Mining Claims known as "Copper Prince" and "Copper Plume," in Cochise County, in the State of Arizona, United States of America.

**PARCEL 3.** California property situate in Eldorado County in the State of California, United States of America, three miles from Onio Ranch; and being known as the Coleman-Barr property, one hundred and sixty acres, held under United States Patent; and Hopkins and Perry property, forty acres, held under United States Mining Claim.

**PARCEL 4.** License for the Province of Ontario for Canadian Patent known as Electro Godeitic Mineral Finder.

The above parcels will be offered for sale subject to reserve bids.

The Purchasers of Parcels 1, 2 and 3, shall pay a deposit of ten per cent. of the purchase money at the time of sale, twenty-three and one-third per cent. within ten days thereafter, and the balance in two and four months, satisfactorily secured, with interest at seven per cent.

The Purchaser of Parcel 4 shall pay a deposit of twenty per cent. of the purchase money at the time of sale, and the balance within ten days thereafter.

In all other respects the terms and conditions of sale will be the standing conditions of the Court.

Further particulars may be had from the Liquidator, E. R. C. Clarkson, 33 Scott St., Toronto, Ont., or from his Solicitors Messrs. Rowell, Reid, Wilkie, Wood & Gibson, 46 King St. West, Toronto, Ont.

The properties may be inspected on application to either of the above parties.

Dated at Toronto this 24th day of July, 1905.

E. R. C. CLARKSON,

Liquidator.

ROWELL, REID, WILKIE, WOOD & GIBSON,

Solicitors for Liquidator.

## JUDICIAL SALE

BY AUCTION, OF THE MINING PROPERTIES, PLANT, MACHINERY AND ASSETS OF

**LAURENTIAN MINING COMPANY, Limited.**

Under the direction of J. A. McAndrew, Esquire, Official Referee, there will be sold by Messrs. Suckling & Co's, Auctioneers, at their auction rooms, 66-68 Wellington Street West, in the City of Toronto, on Saturday, the sixteenth day of September, 1905, at the hour of twelve o'clock noon, the mines, plant, machinery and assets of Laurentian Mining Company, Limited, as follows:—

Mining locations in Manitou Lake Region, District of Rainy River, Algoma, Province of Ontario, Canada, consisting of H. P. 400, H. W. 21, H. W. 22, H. W. 207, H. W. 252, H. W. 265, H. W. 266, H. W. 267, H. W. 248, and H. P. 371, aggregating 577 acres more or less, together with buildings and machinery as per inventory, amounting to.....\$38,444.98

Buildings consist of Power House, Oil House, Shaft House, Boiler House, Assay Office, Manager's Residence, Blacksmith Shop, Mill Building, Stamp Mill Complete, Stables, Cook Camp, Sleeping Camps..... 22,987.21

Also chattels, supplies, and loose machinery, including 2,444 cords of wood and a Boiler at Dinorwic Station.

Ore in the dump, value placed at..... 1,000.00

All the above assets will be sold in one lot and subject to a reserve bid.

The properties may be inspected on application to E. R. C. Clarkson, Esquire, 33 Scott Street, Toronto, where the Stock Sheet and detailed schedule of assets may also be inspected.

**TERMS OF SALE.**—10 per cent in cash at time of sale; 23 1-3 per cent, on completion of sale, and balance in two and four months, satisfactorily secured, and with interest at seven per cent. (7%).

In other respects the conditions of sale will be the standing conditions of Court.

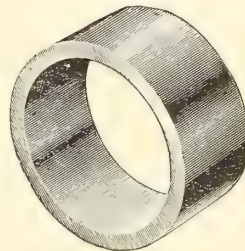
For further particulars apply to E. R. C. Clarkson, Esquire, or to his Solicitors, Messrs. Parker & Clark, 59 Yonge Street.

Dated at Toronto this twenty-fourth day of July, A.D. 1905.



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## JUDICIAL SALE

BY AUCTION OF

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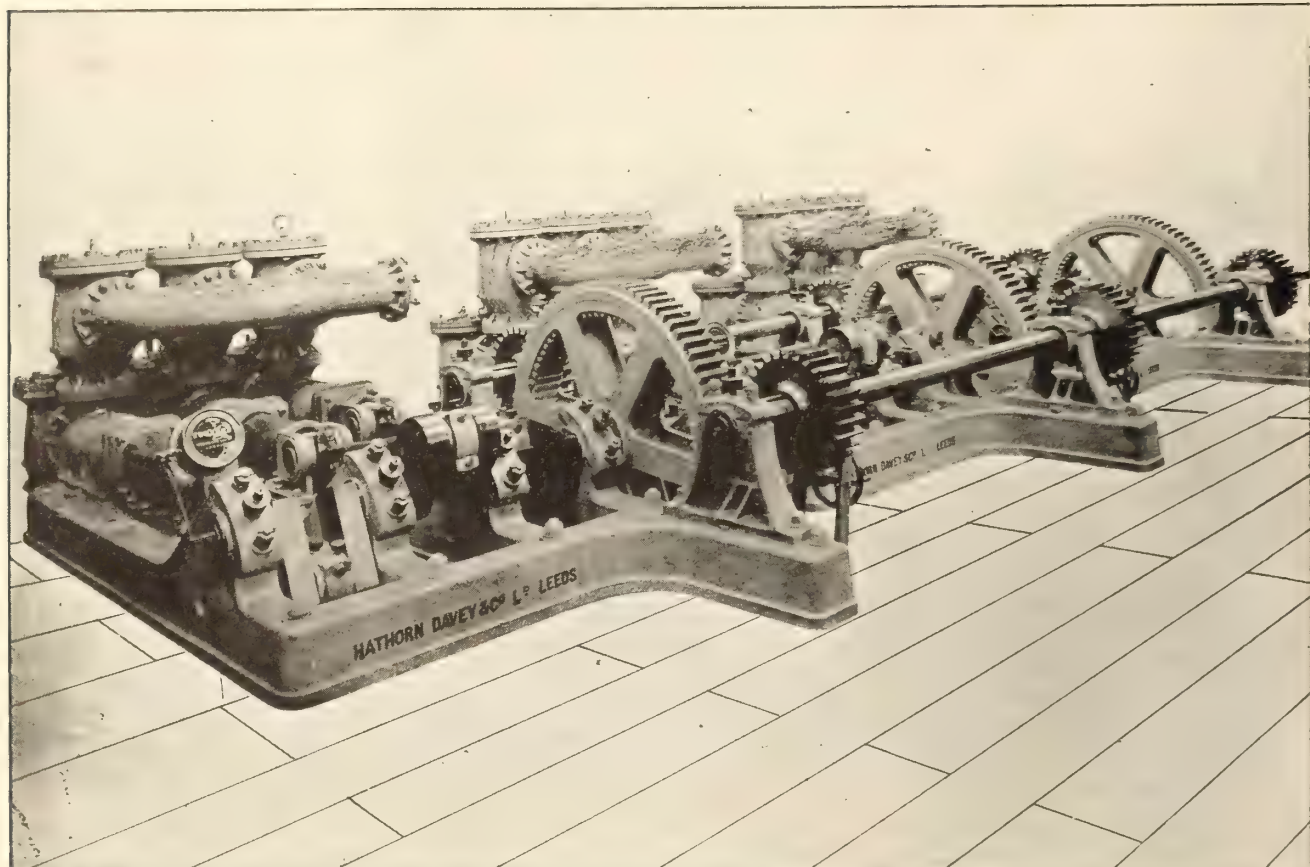
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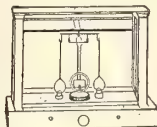
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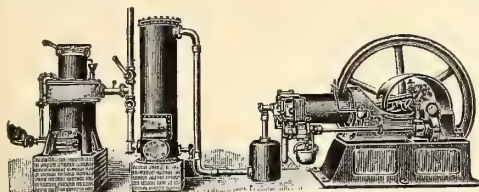
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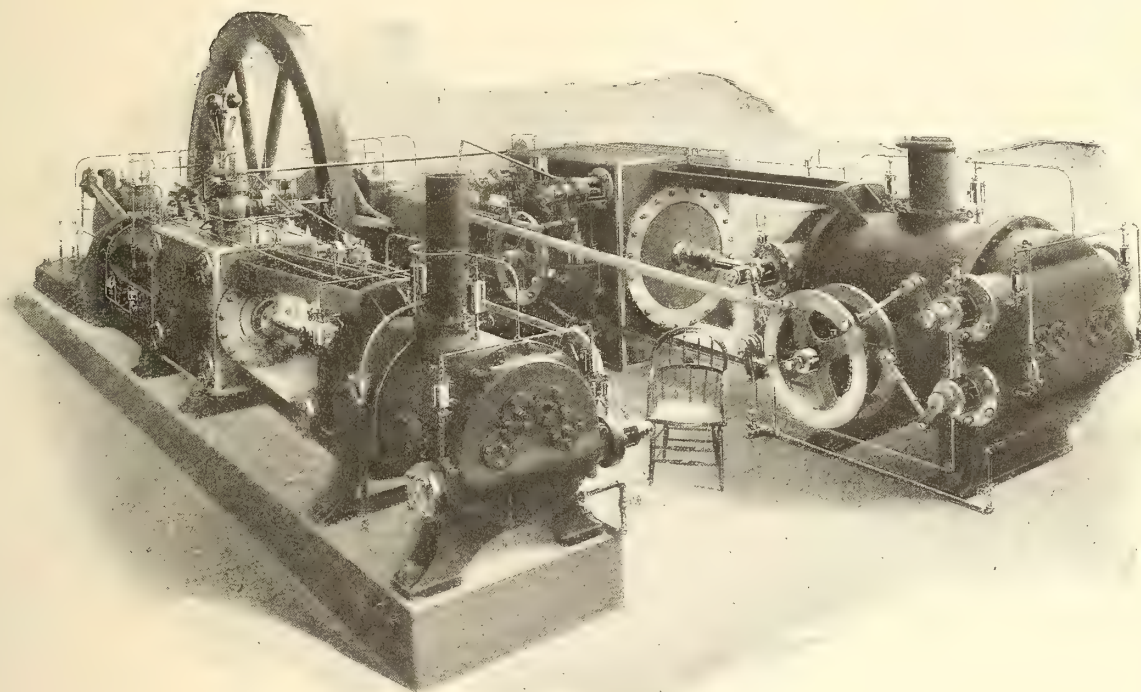


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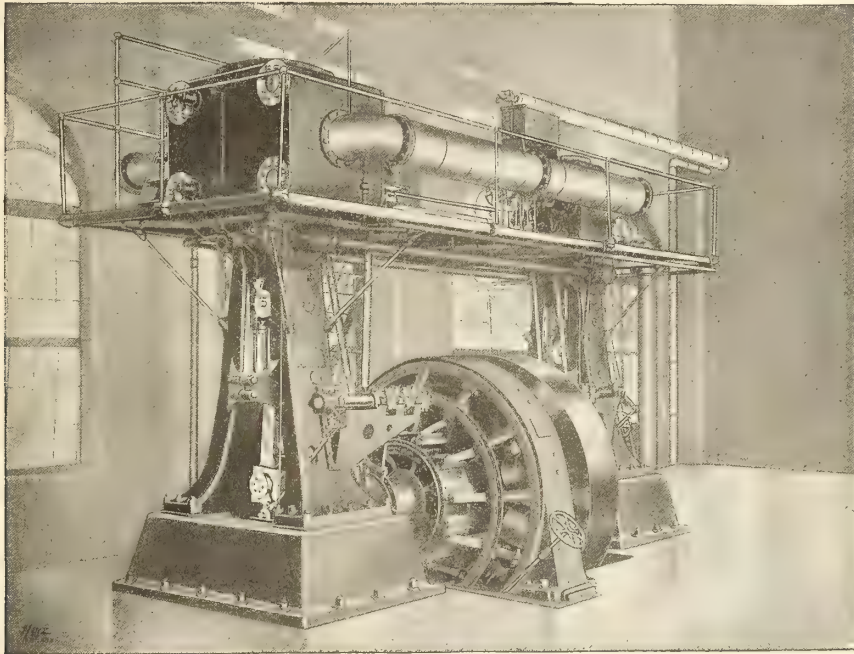
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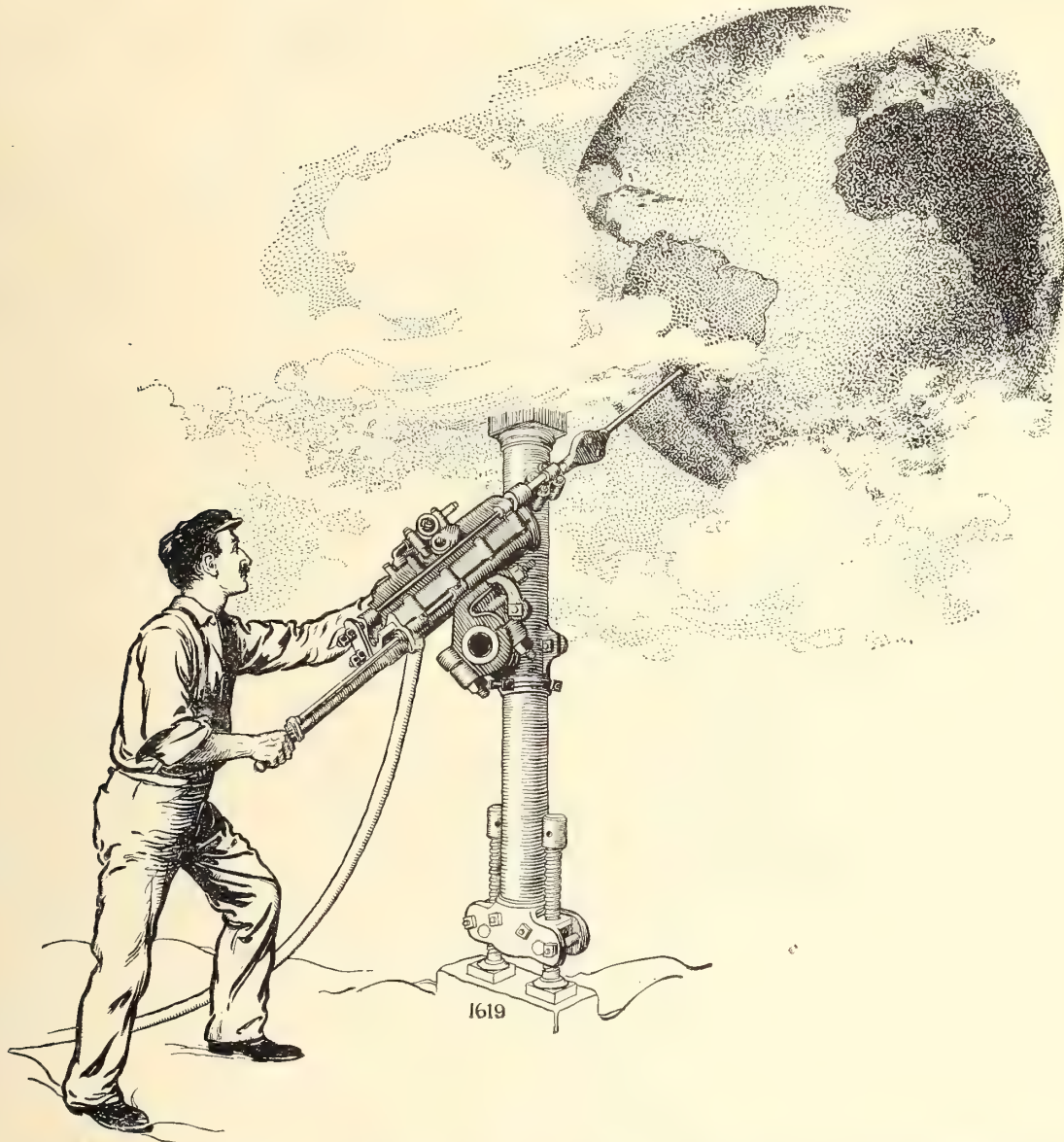
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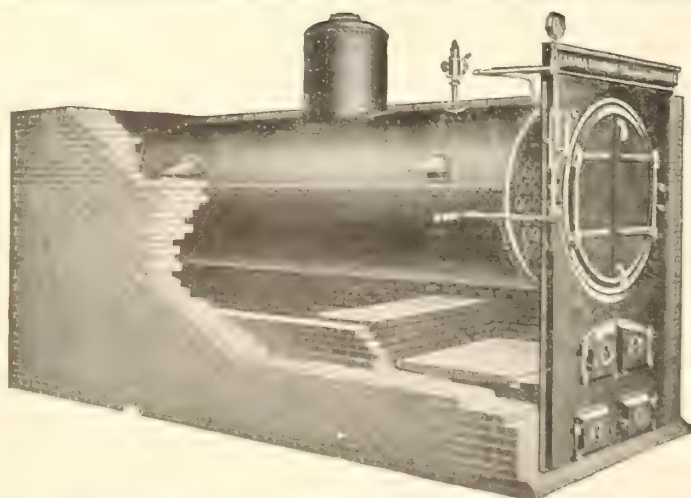
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The REVIEW appears this month in a somewhat changed, and, it is hoped, a more convenient form, the page having been reduced from what is known as a royal to a demy sheet, the latter having been generally adopted as a standard by the leading technical periodicals on this continent. It is believed the change in size will be approved by those who file or bind this journal, as the smaller dimensions will permit of the easier disposition of future volumes in the book-shelf or book-case, while the

monthly issue will doubtless be more readily handled and perused. The reduction in the dimension of the page is, of course, far from being an attempt on the part of the publishers to economise on cost, and so cheat the readers of the REVIEW out of so many hundred or thousand words per month; but, on the contrary, in making the change, which has necessitated increasing the number of pages over those usually printed, the monthly expenditures on account of printing will be considerably heavier than formerly, the departure having been made solely in the interests of our subscribers and advertisers.

The Assistant Secretary of the United States Treasury, who has direction of Customs' affairs, after hearing the argument in regard to the assessment of duty on "zinc lead ore imported into the United States," has decided that such ore should be taxed 20 per cent *ad valorem* on the zinc contents, basing his decision on the fact that the small percentage of lead which the British Columbian ores carry does not entitle them to be classified under the head of "lead-bearing." A decision as to what percentage of lead constitutes a commercial quantity has not yet been rendered, the matter being still under consideration. Now the question has been decided, Canadian miners may readily grant that from an ordinary business standpoint they have been treated in no wise unfairly, and it is merely surprising that their Joplin competitors allowed matters to drift under the old arrangement as long as they did. Meanwhile, we are glad to know that the Dominion Government has acceded to the request of the British Columbian zinc producers, and others interested in the industry, and that ere long an authority on zinc ore deposits and mining will be retained to make a thorough examination of and report on the zinc resources of that province, and at the same time offer recommendations as to method of treatment and the development of markets.

It is not likely that many people will take advantage of an invitation extended to the public by



Messrs. Fox & Ross, stockbrokers, of Toronto, to invest in the shares of a British Columbia company, on whose property, according to a report (so the advertisement states) of a Mr. A. F. Hogue, mining engineer ("formerly manager of the great Broken Hill mines of Australia, from which hundreds of millions of pounds sterling were taken by its fortunate English shareholders") "is a showing that is almost an exact counterpart of this famous mine;" even when they are told, too, that these claims, which are described as the King Edward mines in the Boundary district, are situated only about eight miles from the Granby ("the Mother Lode shipping about 20,000 tons weekly"). This seems to read as if the advertisers wish to intimate that the Mother Lode was one of the properties of the Granby Company, whereas the property is owned by the British Columbia Copper Company, of Greenwood, and its shipments do not exceed 4,000 tons of ore a week. We are not aware that any such mine as the King Edward exists in the Boundary district, although there is a group of claims of this name, at Keremeos, in the Similkameen district, some 40 or 50 miles, at least, distant from Greenwood. As we have stated, any one trying to sell British Columbia mining stock in the east at the moment is wasting his time, therefore there is no particular necessity to quarrel with promoters or others who resort to misstatements in the attempt to do so. The public just now can afford to laugh.

The *British Columbia Mining Record*, in championing Mr. A. J. McMillan, the Le Roi Company's managing director and general manager, against the criticism of which he has, of late, been made the target, states that: "The reply to the allegation that he is gutting the mine is that he is only shipping to the smelter ore that can be mined and treated at a profit. His carping critics complain further because profits that are being applied to development at depth—down to 1,550 ft.—are not available for distribution among the stockholders. They are indeed hard up for proof of Mr. McMillan's alleged unsuitability for the important position he so successfully fills when they misrepresent him in this connection. If there is one thing more than another required to ensure permanence of the mining industry in this province, it is to prove that ore, of profitable quality occurs at considerable depth. This, Mr. McMillan and his competent officials are doing, and doing it thoroughly, yet misrepresentation and abuse are indulged in. It is evident that the old fable of the man who was blamed whether he rode or carried the ass still finds application. Mr. McMillan, however, is not giving the fault-finders the satisfaction of answering their complaints. Like a wise man

he is reserving the rendering of his account of his stewardship for the next general meeting of Le Roi shareholders, who will judge him by the gratifying results achieved, and not by criticism that is manifestly unfair."

We reprint our contemporary's statement in defence of Mr. McMillan, in order to give it the fullest possible publicity. By all means, let's have fair play and defer judgment until after the Le Roi annual meeting. But if Mr. McMillan's attitude in connection with the proposed Le Roi-Centre Star consolidation was disinterested and unprejudiced, then what was the attitude of Mr. G. S. Waterlow? Despite Mr. McMillan's opposition, we have good authority for believing that the consolidation scheme will yet go through.

Quite an interesting story might be written, entitled, "The Travels of a News Item." Here, for example, is the basis of a plot—

Special information appeared in the June issue of the *Canadian Mining Review* (page 144) referring to the prospect of a sale of the Consolidated Cariboo Hydraulic Mine to a syndicate, represented by Mr. John Hays Hammond. This information was copied with and without credit by several of the newspapers in British Columbia, and finally is returned to Montreal in the form of a special despatch from a Vancouver correspondent, who notifies the *Montreal Star* that he learns "on the best authority that the directors of the Consolidated Cariboo Hydraulic Mining Co. have given an option on their property to Mr. John Hays Hammond, etc., etc.," these being the identical words used in the article which appeared in the *REVIEW*. It is reasonable to suppose that such a rambling excursion was not undertaken without some expense, and it is to be hoped that the Vancouver correspondent, at least, was adequately remunerated for his pains.

There is at the moment a formidable agitation in the Province of Ontario for the imposition of royalties on minerals, but more especially on cobalt and silver in connection with the new Temiskaming discoveries. Mining men, so far have regarded this agitation with comparative indifference, but, in view of past experience, are scarcely justified in so doing. With unthinking people plausible reasons can always be urged for killing the goose that lays the golden egg. Some will doubtless recollect that when the industry appeared to be entering on an era of prosperity in 1890-91 the Ontario Government and Legislature imposed a system of royalties which had the effect of paralyzing the industry. As soon as the effect was noted an agitation arose for the abolition of the royalties, and they were, in 1900, abolished with universal approval. Nor is this the only experience. Mining operators in Ontario should



watch the agitation much more closely than they are doing. The Canadian Mining Institute is on record as being utterly opposed to the system of royalties, and if need be, the attention of the Council will be directed to the present movement in order that an organized effort may be made to oppose it.

We have received a copy of the prospectus of the Hill Crest Coal & Coke Co., which has been formed with a capital of \$500,000.00, and a bond issue of \$250,000.00, to operate coal mines near the town of Frank, Alberta, one mile and a half from the Belleville Siding of the Crow's Nest Pass Railway. The prospectus is, in many respects, a model one. In the first place, the capitalization is exceedingly moderate; the shares are issued at their par value and the money so realized is to be utilized for strictly business purposes, the promoters receiving only \$50,000.00, to be paid them in stock. Of the total bond issue—bearing interest at 5 per cent. for thirty years—an issue of \$150,000.00 is to be placed on the market, it being proposed to establish a sinking fund to provide for repayment. The remaining bonds, to the value of \$100,000.00 can be issued only to reimburse the Company for 75 per cent. of future expenditures which may be made in developing the mine, or in the acquisition of additional property, but none of these bonds can be issued until the Company's net earnings are at least double the amount of the interest charges on the bonds then outstanding, plus a sinking fund of \$3,452.90 per annum, and double the amount of the interest charges which would accrue on the additional bonds then proposed to be issued, with a sinking fund sufficient to retire these bonds at maturity. The property itself appears to be a very valuable one, and comprises an area of two miles by half a mile of coal rights, including three large workable and developed seams of coal, and two smaller seams upon which no development work has been done. The company also owns clay rights for 120 acres of fire-brick clay, two square miles of timber limits, water power and other assets. The mine is capable of producing 1,000 tons of coal a day, while it is stated there is an assured market for 600 tons. This, of course, at present, is the great difficulty in connection with coal mining in Alberta, but while there appears to be ample coal of excellent quality, there is a decided limitation in the matter of markets. The company's engineer states that the coal here is similar to the Frank coal, which is a favourite locomotive coal, and also possesses good coking qualities. The seams dip to the west 32°; the roof being very strong sandstone, and the floor being also hard, necessitates the use of very little timber. It is estimated that in one or two seams above the levels from the bottom of the 300 ft. incline there are ten million tons of coal available, less 25 per cent. for loss in working.

Shareholders of the Ogilvie Gold Dredging Co., Ltd., received in July a circular letter or report from the President and Manager, Mr. William Ogilvie, which, in respect of lack of information, is certainly unique. We have in previous issues commented on the autocratic way in which certain officials of this corporation withheld information from shareholders, and have expressed the fear that the future held little promise for them. The present document is confirmatory evidence. Mr. W. Ogilvie, the Manager-President, or the President-Manager, in this last letter or report or document (which by the way is not dated) states that he is "trying to secure the funds necessary" to put the business "on a practical working basis, but at present can say no more." Is it that he is without **hope** that prevents his giving the shareholders details? or is it that he is fearful that the apple-cart may be upset if full information be laid before his corporation?

Mr. Ogilvie also coolly informs long-suffering shareholders that while he believing (as he says) "in Stewart River as much as I (he) ever did," it has long appeared desirable to him "to secure ground more favorably situated to the work." He complains that the height of water "and other conditions" are not as constant "as those used to our Eastern streams would consider natural and proper." What have "those used to Eastern streams" to do with the question? Why should it matter what "those used to Eastern streams" think is "natural and proper." Was not one of the reasons why Mr. Ogilvie was engineered to the management of this concern because he was "used to" Arctic streams? We must confess to an incapacity to understand this reference to Eastern streams.

In brief Mr. Ogilvie's report is a disingenuous effort to turn his company, its funds and effects to new ground on the Klondike over near Dawson.

In the statements of expenditure submitted there are items well worth an explanation. For instance, we find that out of a total expenditure of \$76,302.56, the sum of \$29,222.65 is charged to "miscellaneous expense" account, so that 38 per cent. of the whole sum expended is denominated "miscellaneous." Again, the "salary account" for a total of \$3,500.78 worth of gold dust recovered, is \$23,000.00, so that it has taken \$6.40 in salaries to earn \$1.00 in gold dust. The two items of "miscellaneous expense" and "salaries" have absorbed 70 per cent. of the total amount expended, while labour, fuel, etc., all lumped together under the head of "maintenance and repairs," have only required 4½ per cent. of the expenditure.

Truly, one wonders what sort of directors this corporation has, Are they wooden men or have they been hypnotized? How long would any business corporation allow its "miscellaneous expenses" to be eight or nine times as great as its income? The expenditure of \$17,221.15 in the year 1904-05



brought forth the magnificent sum of \$2,731.49, that is, it cost \$7.26 to get \$1.00. Truly, this is the case of the mountain bringing a mouse into birth.

So long as shareholders are content with such management as this, just so long will gold mining remain a by-word and a reproach.

It is always gratifying to learn that one's advice is valued, and it is, therefore, flattering to note that the *Toronto Globe* evidently recognizing the force of the editorial remark in our last month's issue to the effect that the daily press of Ontario, judging from its inattention, had failed to realize the importance of the cobalt-silver discoveries in the Temiskaming district, came out a week or so ago with a long account (eight columns) of the Coleman Township, written by Mr. Wallace Maclean. The only unfortunate part of it is that the excellent *Globe* has "gone us one better," and the article is couched in the old familiar bombastic language which characterized the newspaper accounts of mining doings in Rossland during the period between 1896 and the end of 1898. A crowning touch of (unconscious) humour, however, is to be found in a sub-headline wherein it is solemnly affirmed that the writer "gives the truth" about the mines; very neatly suggesting perhaps that former articles had not observed this detail. As a matter of fact, the brief notices previously published in the *Globe* announcing the discovery of the field before Christmas, 1903, were reasonably accurate, whereas, the present account is—well, the exaggerations are somewhat noticeable. The same issue of the *Globe* contains a leading article, commenting on the statements as presented by Mr. Maclean, the substance of which inclines one to the opinion that the editorial staff of this important newspaper must include a writer far advanced in senility, or in complete ignorance of his subject. In view (for example) of the information contained in Prof. Miller's published account of this district (Thirteenth Report of the Bureau of Mines, Ontario, 1904, p. 96) where the character of the deposit is quite clearly defined, as being "distinctly veinlike in form" and of only a few inches in width, and as "dipping almost vertically," there was surely no excuse for such a statement as the following: "It is quite impossible to form any definite conception of the extent and value of this great bed of silver ore, but it is evidently quite safe to assume that the rock is argentiferously rich over a considerable area." The utter, idiotic nonsense of which the ordinary newspaper writer is capable and does produce, when discussing technical matters, is well exemplified in this article to which we allude. The harm of such writing was demonstrated ten years ago when the Eastern Canadian press was largely responsible for the British Columbia boom, the injurious effect of which is still felt by the mining industry of that

province, while hundreds, if not thousands of people resident in our Eastern Canadian cities suffered considerable financial losses in consequence. Ontario now may well cry: "Save me from my friends." Of the mineral wealth of the province there can be no doubt; progress henceforward will be rapid and success undoubted. The only danger to be now apprehended is the provincial boomster, from whose machinations, good Lord, deliver us.

We regret the necessity of challenging Mr. Maclean's figures of production, but as we had a representative in the field only a week previous to that gentleman's visit, and as our figures do not agree at all with his, we feel justified in questioning whether Mr. Maclean took the necessary trouble to secure reliable data, and more particularly so as he inadvertently acknowledges in his article the impeachable evidence on which his figures are calculated, e.g.: "The production of this mine (McKinley-Darragh) is placed at \$75,000. This figure is hardly correct but with the fact that only 13 carloads have been shipped. \* \* \* Mr. Darragh was not disposed to tell the income from the ore shipped to date, but a gentleman who knows Mr. Gorman told me," etc., etc. The more correct figures for the McKinley-Darragh are \$48,000. \* \* \* Likewise in the case of Mr. Lawson's property:—"One carload (tonnage unknown) has been shipped. In the absence of Mr. Lawson I have estimated the value of the carload at \$60,000."

From figures which the REVIEW obtained at the expenditure of some time and trouble, the total production of the district up to the 15th day of July was \$1,560,000, of which the value of the tonnage actually shipped amounted to less than \$1,245,000, or about 50 per cent. of Mr. Maclean's figures. This production of a million and a quarter dollars is the result of one and a half year's work. The total production to the first of April, 1905, was \$640,000, for the three and one-half months following (to July 15th), the amount was \$605,000. Canada cannot afford another fake mining boom such as she experienced from 1896 to 1905. To overestimate or to exaggerate our resources is to court disaster, and produce revulsion. The London market does not recognize the fact that British Columbia is rising resplendent from the ashes of its boom, and is now established on a solid mining basis; nor will it, in all probability, for a few years yet. Our newspaper friends in Toronto will do well to remember the disastrous effects of their zeal in the Rossland boom. Let us have facts, by all means, but let us not listen to suppositions nor hearsay yarns.

The Halifax *Morning Chronicle*, with a lack of courtesy that is somewhat surprising in a daily newspaper of standing, insinuates that the remarks



published in the REVIEW last month on the subject of iron mining in Nova Scotia wilfully misrepresented the facts in order to depreciate the value of "securities which the market report shows are highly esteemed." This suggestion is unworthy of our contemporary. The *Chronicle* is, however, correct in its assertion that the paragraph in question laid insufficient stress on the commercial importance of the Torbrook and Londonderry deposits, and we hasten to make amends by printing in this issue a specially contributed descriptive article on the Londonderry Iron & Mining Company's works and properties. This is the first, of what we hope will be a series of articles on the iron ore fields of Nova Scotia. But the general truth of our contention, that no commercial iron ore (with the exceptions as noted) has yet been discovered in Nova Scotia, does not, we think, afford much opportunity for controversial discussion. A commercial iron ore is an ore that will readily sell in the ore market. Such an ore must contain from 50 per cent. to 60 per cent. of metallic iron, not over 10 per cent. of silica, with phosphorus, sulphur and titanium well within certain narrow limits. How much ore in Nova Scotia is equal to these requirements? The sole object of the REVIEW in denying the discovery of commercial iron ore in the province was to prove that a bounty on iron ore production would be of no practical assistance to the Nova Scotian iron and steel industries. The *Chronicle* now, not very logically, it seems to us, replies:—

"If this condition of things turns out to be unfortunately true then the Government will incur no expense in the payment of bounties."

But what about the iron and steel manufacturers? And adds:—

"We cannot understand why the very existence of iron ore in commercially productive quantities should be denied in order that an argument against the payment of a bounty should be manufactured. The truth is, it is no answer, and the further truth is we have many known deposits abundant in quantity and excellent in quality. Emphasis is laid on the alleged fact that the existing iron manufacturers have searched for ore and found it not. What value can be given to the argument even if it were based on a fact when we reflect that these searches were made on properties owned by others, which companies named probably could not buy at their own price. At the best the reports of the iron manufacturers could not be considered disinterested under such circumstances."

It is rather a waste of time and space to discuss the matter much further, but if it be true that Nova Scotia has "many known deposits abundant in quantity (sic) and excellent in quality" then as it is manifestly to the advantage of the local industrial concerns to utilize local ores, why are these rich deposits neglected? Our contemporary has presumably the interests of Nova Scotia at heart. It therefore surely does not realize that in proposing to substitute for the present bounty on manufactured iron and steel (which is a reality) a subsidy

on iron ore production (which is entirely problematical), it would aim a heavy blow at one of the chief industries of the province.

#### A NATIONAL DEPARTMENT OF MINES.

It is now very generally understood that the Dominion Government is about to act in accordance with the repeated representations and recommendations that have been made by mining and other organizations during recent years, urging the establishment of a Department of Mines at Ottawa, under the direction of a responsible minister. Matters have even gone so far for the rumour to be circulated that this portfolio will be offered to the Hon. Senator Templeman. At the moment, we need merely remark, as this report is entirely unconfirmed, that in the event of the creation of a Department of Mines there are few men who would be better qualified to undertake the direction of it than the hon. gentleman, who, as one of the representatives of the "mineral province of the Dominion," is naturally well informed concerning the necessities and requirements of the mining industry. The practical and scientific work in connection with the Department of Mines would, however, necessarily be under specialist direction, and it is essential that great care should be exercised in the selection of an officer to undertake these important duties. In the United States this work is in charge of the Director of the Geological Survey, the law having provided that "the Director shall have charge of the mineral resources and products of the national domain." Such an arrangement is manifestly a sensible one, as, of course, the function of the Geological Survey is, first and foremost, to assist the development of the mineral resources of the country. While the Geological Survey of Canada is doing, and has done, useful work on economic lines, there can be no question that the present system is imperfect in many material respects, and that the service might be reorganized or remodelled to very great advantage. During the past year or so we have had at Ottawa a Geological Survey and a Mines' Office, the latter working quite independently of the Survey. There is also a mining section of the Survey. It may be readily understood that, so long as these two institutions are maintained upon independent lines, the work of each is rendered less effectual, while expenditures are necessarily greater than they would be were the two departments under one direction. It is quite possible, for example, for work to be duplicated, and a recent case in point might be cited. We are now on the eve of a very considerable mining progress in the Dominion. The last half a dozen years have been regarded as a time of depression, but this is only true in a sense that there has



been no stock speculation. On the other hand, there has been a steady and continuous development of our resources, an improvement in market conditions and a general extension of the productive mineral area. The establishment of an adequately equipped Department of Mines at this juncture would, therefore, be most opportune and desirable. The publication of bulletins at regular intervals giving the statistics of production; the issuance of monographs dealing with special phases of industry or describing the conditions of production of some particular mineral, or reporting on new territory and discoveries, are needed to interest capital in the industry, and to assist those now engaged in the country in developing its resources. Without desiring in any way to reflect on the work of the Geological Survey of Canada during recent years, one must admit that a very large number of the reports issued have either been valueless (on account of the delay in publication) or the information they contained was not of the kind that is desired by mining communities. Comparing our system with that of the United States, where a very high standard of efficiency is maintained, one necessarily realizes how much Canada has to learn. It may, of course, be argued that the efficiency of the United States Survey is merely the result of a lavish expenditure of money, and that, in this respect, Canada is not in a position to follow, but while, doubtless, the large appropriation made for geological work in the neighboring republic is naturally conducive to the best results, these would not be obtainable were it not for the system that prevails. The great difference, in short, between the United States Survey and our own institution is that, the one is organized and the other is not; the one is non-political in character, whereas the other is hampered by political restrictions. Thus there can be no doubt that the successful work and efficiency of the United States Geological Survey is largely attributable to the fact that it, by the act by which it was established, is completely and absolutely divorced from any consideration of political influence. The members of the staff are not mere proteges of influential politicians, and are not, therefore, appointed regardless of special fitness or talent, but, instead, are required to pass qualifying examinations by which their abilities are very searchingly put to the test. Moreover, no man's services are required unless he displays a proper amount of zeal, energy and capacity in the performance of his duties. Another excellent feature conducive to the satisfactory conduct of the service is a provision vesting in the director full authority for the appointment or dismissal of members of his staff; while, too, it is possible to secure and retain really valuable assistance, as the salaries paid to members of the staff compare favorably with the remuneration professional men of equal standing are accustomed to expect from ordinary business under-

takings desiring to requisition their services. In both respects our system in Canada is dissimilar. The hands of the Director of the Canadian Geological Survey are tied by the Civil Service Act to such an extent that he practically has nothing to say in the appointment of his assistants, nor can he dispense with the services of useless individuals. Again, so inadequate are the salaries paid at present to members of the staff that it is practically impossible to retain—although there are one or two notable exceptions—really good men in the service for any length of time. To compare still further, the United States Geological Survey does not permit its members to engage in private practice. In Canada, last year, we had the unedifying spectacle of a member of the Geological Survey reporting, at the expense of the country on a coal area, in order, primarily, to assist a joint stock company owning this area to dispose of its shares to the same public. In this case the report was actually permitted to be handed to the company in question and printed by them in a prospectus before it was published by the Government in the ordinary way. Such practices as these should not be tolerated for a moment, and it is not too much to say that they not only bring the Survey into disrepute, but, to a large extent, neutralize the effect of any good work that may be done. It is fairly safe to assume, we think, that a Geological Survey in any country is not created merely as a department for the conduct of scientific investigation, but it is, first and foremost, a governmental bureau intended to benefit the general public, not necessarily the scientific public; but to be regarded as machinery provided by government to aid in the economic development of the country.

An instance, meanwhile, of the present lack of organization of our Geological Survey is afforded in the circumstances that a geologist now going into the field is required to spend at least two-thirds of his time in making topographical observations and in compiling maps from this data; thus he has had but little time left to devote to actual geological work. This is obviously a waste of time and also of money, for a geologist, as a rule, commands a higher salary than a topographer. In the United States, and other countries, the practice is to dispatch skilled topographers to a certain district or region to make a topographical map thereof, in order that the geologist may subsequently use it as the basis for his work. This plan should undoubtedly be adopted in Canada, and the regular field staff of the Survey should include two sections, namely topographers and geologists, and any district to be investigated should be visited first by the topographer, whose work could then be advantageously followed up by the geologist. In the United States the country is divided up into quadrangles, the survey of these quadrangles being undertaken in the order of their relative economic importance. When this is com-



pleted, four maps are made containing the information as follows:—

- (1) Topography, shown in a map of the area.
- (2) A map showing clearly the geological structure of the area in question.
- (3 and 4) Geological maps—one specially giving all information relative to occurrences or deposits of economic importance.

These maps are also accompanied by explanatory notes, and are regarded as of extreme practical utility by, not only scientific men, but by prospectors and others interested in the mining development of that country.

But, in addition (as has already been suggested), to make the Survey thoroughly efficient, its staff should include a number of mining geologists. The duties of these officers would be to examine and prepare detailed reports on known productive mineral areas, while their labours might well be supplemented by reports made by specialists (not necessarily members of the regular staff) on subjects, which in the estimation of the director, were deserving of special attention, or concerning which the public desired information. The prompt publication of these reports would undoubtedly be a valuable aid to the development of our mineral resources, and in many instances would serve to prevent mistakes or errors of judgment being made in the working of individual properties. Although the present Mining Section of the Survey serves some useful purpose, much more might be advantageously accomplished under proper direction, provided, of course, the funds were available for the purpose. Other countries publish—in some cases monthly, in other cases quarterly—bulletins of mineral production, and other statistics of economic value. Why not Canada? What earthly use (for example) is an annual statistical report for so long ago as the year 1903, a copy of which, issued by the Section of Mines, has just reached us?—though it is perhaps unfair to allude to the tardy appearance of this publication, since the mining engineer in charge of the work was absent from his office for four months last year in consequence of ill health, while he was subsequently engaged in the field on geological investigation until the first of November. But, nevertheless, this is no satisfactory reason, surely, to account for such extreme Departmental dilatoriness. In this connection, it may be noted that, while the report is supposed to deal with the 1903 returns, some of the information is only brought up to 1901. If one is interested in the study of ancient history this publication may possibly possess some value.

A well organized Department of Mines would, then, include a staff consisting of mining geologists, field geologists, topographers, chemists, and the ordinary editing and clerical staff. It should have

at its head a director, young, energetic, tactful, a good organizer, a capable administrator, and last, but not least, a man of high scientific standing and attainments. And we have every reason to believe that Government has already taken cognizance of these requirements.

#### THE LAW OF JOINT STOCK (ONTARIO) MINING COMPANIES.

"The buyer of mining stock is not entitled to any special protection," was a sentiment uttered by Queen's Counsel at a meeting of the Canadian Mining Institute in Montreal, some years ago. The subject under debate was the amendment of the law of joint stock companies. The sentiment quoted was apparently the sense of the meeting, no contrary opinion having been put on record. The consideration of amendments to the various provincial Companies' Acts was referred to a committee, of which Mr. Joseph Bawden, barrister, of Kingston, was appointed convener. No meeting of the committee has been held. It is stated that an insufficient response was given to the invitations sent out for the discussion of the subject. The limbo of good intentions has become the cemetery of the work given to the committee.

There is a world of meaning in the phrase, "the buyer of mining stock is not entitled to any special protection." In the first place he does not seek it, for the reason that in the great majority of cases he finds that he has been fooled, and the public confession of the fact he is unwilling to make, if even for the public benefit. He may be indignant that the Honourable Mr. So-and-so, or Mr. Justice What's-his-name allowed their names to go on the directorate, and he may figuratively kick himself for the stupidity under which he wrote his cheque when the names of these figureheads were pointed out to him. The salve he now applies to the sore spot is the discovery that these social luminaries who were used as deceiving decoys were themselves deceived. His cynicism, which now takes the phase of utter abhorrence of all mining stocks, he no longer pours into the ear of his neighbour Jones, who tells him that *he* made a good thing by investing in one of Heinz's copper companies, and that *he* turned away from a Canadian copper proposition for the sole reason that a political magnate's name was on the list of directors, and was rejoiced afterwards to find that his instinct had guided him safely.

In the second place, the device of any legal protection for the buyer of mining stock would defeat the object for which such stocks are put on the market. The impression, that the object of the company promoter is to raise capital for the operation of a mine in such a manner as to earn dividends, is a wholly mistaken one. The primary object of



the promoter is, as mine-owner, or as mine-owner's broker, to sell out at an enormous profit. If any dividend is earned or can be earned by working the mine, it is viewed simply as a by-product, subordinate to the main object in view. The Joint Stock Mining Companies' Act of Ontario is framed to afford the greatest possible facility for exploiting the public, with no requirement whatever for the exploitation of a mine. In fact, with the application for incorporation (a) proof is not required that the incorporators own a mine; (b) proof is not required that for the purchase or operation of a mine the incorporators have paid one cent into the company's treasury.

In fact, with the absence of these conditions, the Act should be entitled, "An Act for providing facilities for Exploiting the Public by the issue of Mining Companies' shares." That is the practical effect of the grant of incorporation to mining companies in Ontario. And what are the results upon the mining interests of the country? Some of them are here enumerated:—

1. The area of mining lands sold is far in excess of actual requirements. The business of speculating in mining property is stimulated at times very strangely, and by causes difficult to account for. The practice of buying parcels of land many hundreds of acres around a mineral prospect of a few acres loads enterprises at the outset with unreasonable cost. The fictitious advantage of ownership of extended surfaces is laid hold of to give the public an impression of territorial wealth for which no foundation exists.

2. The facilities given for the incorporation of mining companies without guarantees for the initial honesty of the adventure is of benefit to brokers alone in selling shares, and of no benefit whatever to persons honestly desiring to find capital for the honest development of mines, or those seeking legitimate investments in mines. Every fake company is effective for choking off ten honest adventures.

The Legislature of Ontario cannot aid legitimate mining enterprises by throwing down all barriers against the granting of mining company charters except that of a stiff incorporation fee. But it can do much to sift from the speculative efforts of professional wind-bags and get-rich-quick promoters, an immense amount of chaff wherein may be found an occasional parcel of sound grain. It can do this by inspection. It can clothe some functionary with the business of learning whether "The-Last-Chance-of-Your-Life Gold-Mine" is held under a good title by the men who are endeavouring to get a large price for the same, partly in stock, partly in cash. It can make it the duty of its inspectors to enquire into the transactions by which the gold mine with this euphonious title has become the property of

Brown & Jones, and their duty to obtain some honest opinion on the value and prospects of the mine. It should demand from promoters all the information they have as to the value of the minerals on a company's property. From these data it would be possible to pronounce on the good faith of the promoters. Without these data called for, the public may as well be warned that there is no protection given by the Joint Stock Mining Companies' Act against the perpetuation of the foul crime of obtaining money upon false pretences by the issue of mining shares.

The legitimate organization of mining companies for the operation of mining works and the development of mines on a dividend-paying basis are hindered in this province by the lack of system for supporting the initial stage of the development of mines. A period of exploration of deposits and testing of ores should be conducted to a considerable extent before placing mining property on the market. Strangely enough the experience of other mining companies has not been laid hold of to instruct our legislators in what is evidently required in this province. In Cornwall, England, the operation of initial or experimental mining enterprises is safely conducted on the cost-book system until the mines and miners are in need of larger capital, and are in a position to seek for the investment of money in shares of a joint-stock company. In British Columbia mining partnerships may be organized and conducted on a limited-liability principle, having some analogy to the Cornish cost-book system. The Ontario Act respecting co-operative associations, with very little modification, would suit admirably the business of carrying a mining enterprise through its earlier stages, but the Act is inapplicable, for the reason that it especially "excepts working of mines, minerals or quarries." Under it, any seven or more persons who desire to assemble themselves for the purpose of carrying on any labour, trade or business, may become incorporated, with power to make such by-laws as are required for the convenient management of the business. Incorporation is accomplished by signing and acknowledging before a notary or magistrate a certificate of intention to form an association, and by filing therewith a copy of the rules agreed upon by the parties in the office of the Registrar of the Registry Division in which the business is to be carried on. Beyond all question, if the provisions of this Act were extended to three or more persons desiring to work a mine during the stages of prospecting and initial development, much mining work could be accomplished without burdening the enterprise with the cost of joint-stock company incorporation and the flotation of stock upon the dishonest basis presented by so many owners of partially-developed and insufficiently-tested mines.

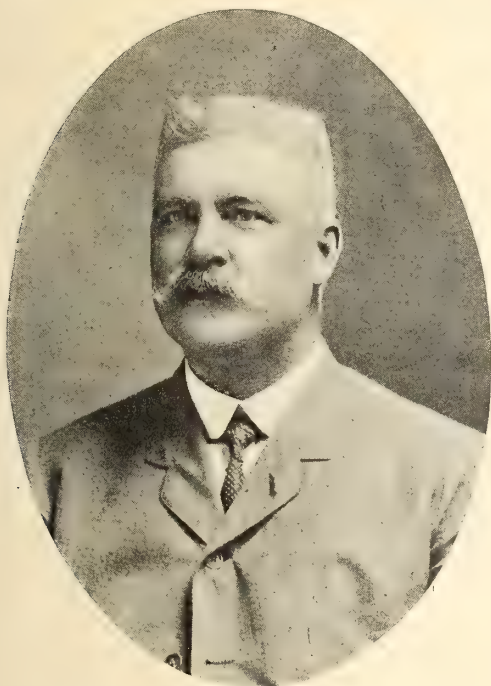


## QUEBEC'S NEW MINERAL REGION.

By JOHN E. HARDMAN.

The REVIEW has already made known to its readers, through the letter of Mr. J. Obalski which it published in the November issue of last year, the fact that a new area of mineral-bearing rocks has been discovered in Northern Quebec, and that exploitation of the same has been commenced by an incorporated company known as "The Chibogamoo Mining Co., Limited." The purpose of the present article is to more fully describe a portion of the new district, its position and present mode of access, and also one or two of the more important discoveries which have already been made.

The region lying south of James' Bay and west of Mistassini Lake has been partially described in



Mr. Peter McKenzie, the Discoverer of Valuable Ores in the Chibogamoo Country.

former reports of the Geological Survey of Canada—one account by Mr. James Richardson was published in 1871, and the accounts by Mr. A. P. Low of his explorations in the same region are found in the reports for 1885 and 1895. In these printed reports mention is made of the indications of probable mineral and metallic wealth which were seen, but no particular deposits are dwelt upon, nor are decided opinions expressed. The honor, therefore, of discovering minerals of undoubted commercial value must be given to Mr. Peter McKenzie, of the McKenzie Trading Company, Montreal.

As related by himself, the circumstances of Mr. McKenzie's discovery were briefly these: In August of 1903, being at the trading post on Lake Ashuap-

mouchouan\* (about 80 miles northwest of Roberval), and having in mind the report of Mr. Richardson (1871) concerning the probable existence of deposits of copper on the western shore of



Mr. Peter McKenzie, Mr. J. Obalski.  
Mr. Herbert McKenzie, Mr. Robert Simmons, Mr. G. McKenzie.

The McKenzie-Obalski Party, Aug.-Sept., 1904.

Chibogamoo Lake, Mr. McKenzie determined to make a trip to that lake, hoping to find the mineral region described by Mr. Richardson, and with a secondary thought of obtaining possible pelts for his trading company.

It was not, however, an easy matter to find a guide to the lake, few Indians being available who knew the route, but two half-breeds were finally



The Ashuapmouchouan River, below Pemonka Rapids.

secured who *claimed* a knowledge of the route, and a start was made. It is perhaps sufficient to say

\*In the spelling of the Indian names of this region there is considerable diversity:—Chibogamoo is spelled Shebougamou, Chebougamoo and Chibogamoo. Ashuapmouchouan is now shortened to Chamouchouan, and so on, but in this article the writer has endeavoured to preserve the original spelling, based on the phonetic language of the Montagnais tribe of Indians, who are indigenous to the country.



that the guides failed in their knowledge, and that Mr. McKenzie had to be his own pilot. Lake Chibogamoo, however, was finally reached, and the "copper mountain" of Mr. Richardson was visited.



Vermilion Falls, Chigobiche River

During the same trip samples of asbestos, lodestone carrying magnetite, pyrites, ochre, quartz, etc., were obtained, and were taken back to Montreal the following winter, where they were examined and assayed.

Early in the spring of 1904 Mr. McKenzie returned to Chibogamoo Lake, accompanied by one of his sons, made a more thorough investigation, and in July returned to Quebec, where, upon description of the location, he obtained a mining license for the asbestos discovery, and prospecting licenses for other portions of the territory; both granted according to the provisions of the Quebec Mining Law.

The then premier of the province, the Hon. S. N. Parent, showed a great interest in the discovery which had been made, and early in August commissioned the Inspector of Mines for Quebec, Mr. J. Obalski, to visit the new mineral region and re-



Remnant of Glacier or Ice Bank Existing on May 29, 1905. This Shows the Lateness of the Spring in this Region.

port upon the same. Mr. Obalski's report to his government was made under date of February, 1905, and has since been printed, and distributed freely

to all enquirers by the Department of Mines, Lands and Fisheries. This, briefly, is a statement of the existing knowledge and facts at the time the writer was retained for an examination in March, 1905.

The portion of Northern Quebec in which these discoveries have been made lies, approximately, along the fiftieth parallel of north latitude, and is in territory which (by Dominion Act) only became a portion of the Province of Quebec as recently as 1897.\* To reach this new region involves a journey of 200 miles from Roberval, 175 of which can, at present, only be accomplished by canoe and on foot. The charter which has been given to the Trans-Canada Railway provides for a line from Roberval to the mouth of the Nottaway River, at James' Bay, a distance of between 400 and 500 miles. If this railway were built, as it has been projected, the new mineral region would still be 25 or 30 miles (at the least) distant from the main line, but the discoveries made at and about Chibogamoo Lake are of such



Party Descending White Spruce Rapids, Ashuapmouchouan River.

importance that it is probable that the line may be diverted somewhat to the eastward, in order that it may serve the needs of the mining population which is sure to come to that country.

Persons intending to make this journey will take canoes from the point marked "Portage à l'Ours" (Bear Portage) on Ashuapmouchouan River. Leaving Portage à l'Ours the route runs upstream for about 35 miles (including 8 portages) to the mouth of the Chigobiche River. After the first three portages, the river is clear for a stretch of seven miles to Pemonka Rapids. Following Pemonka come a series of rapids, some of which are important, and which are named "Pas de Fond," "Hat" and "White Spruce," passing which one reaches the Chaudiere Falls, which are the largest on the river, and whose

\* Prior to 1897 the northern boundary of the Province of Quebec was the height of land dividing the waters flowing into the St. Lawrence from those reaching Hudson's Bay.



height, inclusive of the rapids above and below, as shown by barometer, was 116 feet.

These falls really are a series of three, the first (or main) fall having a clear height of 60 feet, but



The Lower Rapid, Chaudiere Falls, Ashuapmouchouan River.

within a length of one mile the total fall amounted to 116 feet on the 31st of May, 1905. As the water was at a very high stage, it is probable that the mean fall will be found to be about 120 feet. The power available has been roughly calculated at about 75,000 h.p.

Three miles above the Chaudiere Falls the route turns to the west and follows the Chigobiche River through its entire length westerly to Chigobiche Lake, a distance of 26 miles. From the most westerly bay of Chigobiche Lake, 14 miles from its mouth, a long portage leads to waters which flow into Ashuapmouchouan Lake, and the distance between the two lakes by the crooked course of the stream is about eight miles. The Chigobiche River is shallow and rocky, and is an annoying one to traverse in canoes, as, even with the best of care,



Chaudiere Falls in Ashuapmouchouan River, Middle Fall.

these rocks (which are rounded ones) seem to rise up on purpose to scrape the bottom of your canoe and make leaks. Ashuapmouchouan Lake is then traversed for its length of eight miles to the mouth

of the Nikaubau River. In this distance of 108 miles, from Lake St. John to Ashuapmouchouan Lake, there has been a rise of 800 feet, and the character of the country has changed.

The valley of the Ashuapmouchouan, as far as the Pemonka Rapids, is low above the river, and consists of a clay substratum, with layers of sand overlying them. The soil is fertile, and good wheat crops can be grown. Above Pemonka, the banks of the river rise abruptly to heights of 100 to 300 feet above the stream, and, for the most part, are rocky and denuded of soil, which latter is chiefly a boulder clay of no value for crops. These high banks and hills continue all the way to above the Chaudiere Falls, where the banks again become low, flanked by rounded hills, and the soil changes to a sandy loam. The Ashuapmouchouan River varies in width from about a mile at the mouth to 2,000 feet above the Chaudiere Falls. The Chigobiche River has a width averaging about 250 feet. All the timber along the route thus far is a growth which has



The Upper Rapid, Chaudiere Falls, Ashuapmouchouan River.

arisen since 1870, when the whole region from Lake St. John to the forks of the Ashuapmouchouan was burned.

Around Ashuapmouchouan Lake the land is good, and will grow grain. Mr. Robertson, the late factor at the former Hudson's Bay post on this lake, succeeded in raising grain of a very good quality.

Beyond this lake the Nikaubau River and a series of small lakes is traversed for a distance of 38 miles to the height of land, which, along the route, rises from 1,275 to 1,356 feet above sea level. Crossing the height of land an uncharted lake (Obatogoman) is first met with, and at the northwest end, above the narrows, some six miles from the northern end of the lake, is noticed the first change in the country rock of the region.

Hitherto the only formation visible has been the Laurentian, a series of gneisses, with occasional black mica schists, and a few bands of quartzite. The occasional bands of limestone are siliceous. The gneisses usually show quartz, feldspar (of a pink,



yellow, or white shade) and hornblende, which occasionally is varied to biotite. Shortly after passing Lemoine's stake or post (put up in 1898) the change to greenish slates and shales, and to sandstones, is noticed, and for the rest of the way to Chibogamoo Lake the shores are in the Huronian formation.

This change is evidenced also by the different outline of the hills, which has changed from the



Gras Chute, Chigobiche River.

rounded character of the gneisses to the sharp and jagged profiles characteristic of the Huronian sediments and volcanics. The remaining 50 miles is an easier journey than before, as one is going downhill slightly, there being a drop of almost 200 feet from the height of land to Lake Chibogamoo. The altitude of Lake Chibogamoo is given as 1,150 feet above sea level; it has a general northeasterly trend, and its northern portion is split into two parts, the one to the east is called "Bay of Islands,"



Chigobiche River—A Chance Meeting with Indian Family.

and on the west has been named "McKenzie Bay." The Bay of Islands has not yet been explored for minerals, nor is it likely to be for some time, as the gneisses of the Laurentian cover the eastern shore so far as is known. Many of the islands in the lake are also gneissic or granitic in character, and devoid of commercial minerals. The western bay, named McKenzie Bay, after Mr. Peter McKenzie, has a shore line showing Huronian rocks,

which, so far as the writer has seen, are diabase, conglomerates, talcose schists and some pyroxenous rocks of species not determined. The alteration of both sediments and plutonics has been very considerable, and there are many sericitic and chloritic species as yet unnoticed. The lower end of the lake and all the west shore is Huronian, but they have not yet been prospected. The ochres which give its name to "Paint Mountain" drew the attention of both the Indians and early white visitors, and it is on Paint Mountain, or at its foot, that occur the chalcopyrite and the iron pyrites which both Richardson and Low have mentioned in their reports to the Government.

(To be continued.)

### MINING STATISTICS.\*

By FREDERICK HOBART, New York,

The question of the collection and use of mining statistics is like all others, in that it has two sides—the theoretical and the practical. The theoretical side has been so well treated by Mr. Eugene Coste, upon former occasions, that I shall have little to say about it. Some experience in the collection and presentation of such statistics have, however, given me definite ideas, the brief presentation of which may be of service.

The first question is, what is the use of such figures? That, I think, is readily answered. A knowledge of the work done is essential for the benefit of producers and traders. To the miner and smelter it is of great importance to know the course of production which may seriously affect the value of his own output. The figures of production in all metals, for instance, have an important bearing on trade. Under or over-production are very important factors. To know what has been done in a given period, and to know it as early as possible, is the chief object of the practical worker. Thus, the approximate return of output for a given year, or other fixed period attainable, say two or three months after the close of that period, is far more valuable than the exact returns published ten months or a year later. Accessible at the earlier date they serve as a guide; later their value is only historical.

The Mines Section of the Geological Survey of Canada has set an excellent example in this respect. Its figures are now before us, and for several years past it has been the practice to present them about this time. The labor involved in this can only be appreciated by those who have done similar work. The United States Geological Survey also collects statistics, but its figures are not usually complete until about a year after their date; that is, the returns for 1903 were not published in full until almost

\* Trans. Can. Min. Inst., Montreal Meeting, March, 1905.



the close of 1904. For this reason, the work of the Survey has, for a number of years past, been forestalled by private enterprise. Though I have had a part in that work, I think I am justified in saying that it has been acceptable to the mining public. I know that it has proved successful and profitable, showing a definite appreciation.

No one, of course, can claim perfection for his work. I will say, however, that I have found the great majority of producers willing to co-operate and assist by furnishing definite figures at the earliest possible date; only requiring a promise that the information shall be used only in making up totals, and that individual returns shall not be published. Without any official backing, I have found that producers realize the advantages referred to above, and are willing to aid, even at the cost of some trouble to themselves. A few exceptions are found, and one important company, which is, unfortunately, run on the "blind-pool" basis, persists in withholding all information. It does not take even its own stockholders into the confidence of its managers. Outside of this one conspicuous offender, there are very few who do not willingly furnish returns.

Perhaps I have discussed too much on this point, but I want to present the practical points as fully as time will permit, because I realize how strongly the other side has been heretofore presented to you. We have a clear, printed, brief, easily understood statement of production, which is undoubtedly of use to mining men; which can, as a rule, be prepared and presented in a reasonable time and at a possible cost of money and labor; and which commands the support and assistance of the great majority of producers. How successful this is, in a practical way, may be shown by the fact that the estimate of output of one important metal, made and published only five days after the close of the year 1903, varied from the full and corrected figures, secured later, by only four-tenths of one per cent. I trust you will not take this as a boast, but only as an example of what can be done in practice.

So far, I have only considered the relation of statistics to the mining world. To the general public their principal value is to convey a definite impression of the importance and standing of the mining industry, and its claims upon their regard and consideration.

This brings us to the question of valuing production. My own experience has not led me to attach much importance to values. The main point to be known usefully is the quantities. The value is simply a counter which enables to state a total. One cannot add together ounces of gold and tons of iron ore; it is necessary to find a common unit. And here a question of some difficulty presents itself, in the determination of prices. In valuing metals, for instance, what price shall we take? The one standard easily accessible is the current or average price

at important market centres. It is true that the value at mines or smelters is somewhat below that. There are freight charges, perhaps refining charges and other deductions to be made. But if we once attempt to make these, we are lost in a sea of uncertainty. We have cast loose from our definite standard and cannot find another with certainty. My own belief is that it is better and fairer to accept standard prices at the commercial centres as a rule. It involves a slight over-valuation, but the proportions to the total of the mineral product are so small that they cannot be considered misleading.

In all statements of mineral values there must enter of necessity some arbitrary element. Thus I had recently to go over the accounts of a certain coal mining company. The books were well kept, the statements clear, and the case was a plainer and simpler one than is often found. I give below a summary statement, using round figures which can be more quickly grasped.

The total product for the year was 2,000,000 tons, of which in the disposition made, 600,000 tons were classed as run-of-mine; 600,000 tons lump, which means, under the Western schedule, coal passing over an  $1\frac{1}{4}$  in. screen; 350,000 tons nut, or coal passing through an  $1\frac{1}{4}$  in. and over a  $\frac{3}{4}$  in. screen; 450,000 tons slack, which means all passing through the  $\frac{3}{4}$  in. screens. The railroad company serving the mine took 300,000 tons at a fixed price, under a contract which gave it the right to do so and, on its side, granted the company a fixed freight rate on coal shipped. The commercial sales, on coal, amounted to 1,350,000 tons. The company operated during the year—for the first time—a coke plant, just completed, in which washed slack was converted into a fair foundry coke; about 150,000 tons being made. Now the account stands as follows, the prices being averaged for the year:

Railroad sales:

Run of mine . . . 300,000 tons at \$1.20..\$ 360,000

Commercial sales:

Run of mine . . . 200,000 " " 1.30.. 260,000

Lump . . . . . 600,000 " " 1.60.. 960,000

Nut . . . . . 350,000 " " 1.40.. 490,000

Slack . . . . . 200,000 " " 0.75.. 150,000

Total sales 1,650,000 " (av.) 1.33: \$2,220,000

Made into coke,

slack. . . . . 250,000

Used on operating

mine, run-of-

mine . . . . . 100,000

Total . . . . . 2,000,000

It may be added that the 150,000 tons of coke sold at an average of \$2.30 per ton at mine; rather a low price being accepted for a branch new to the market. No by-products were saved; but one bat-



tery of ovens was fitted with an arrangement for saving the gas, which was used to make steam, thus reducing to some extent the quantity of coal used in operating the mine. This gas-saving plant is to be extended, and it is proposed to use the gas, through gas engines to generate electric power.

Now here is about as plain a case as is often found, and, yet, as to 350,000 tons, or 17½ per cent., of the mine product it was necessary to assume an arbitrary price, in order to give a value for the whole. Of course, it was not difficult to do this, but it was still an arbitrary price. Where there is more complicating of accounts and more assumed values, how can we trust them? And four-fifths of our values are founded on assumptions.

It is for such reasons that I have been led to attach little importance to values; considering them, as I have said, only a medium through which totals can be figured out. The only rule that can be made for them is to fix a standard, and then adhere to it as closely as we can.

Turning now briefly to the theoretical, or scientific side of the statistical question, we should have all the information in detail: First, the quantity of crude or first product as taken from the earth—the crude ore mined and the cost of mining it. Then the secondary products—those which have passed through a preliminary process, but are not yet in marketable form. Such are ores milled and concentrated; mattes and the like. Then comes another stage in which the product is in an advanced stage, but still not ready. Examples of this stage are lead bullion; converter bars, blister copper, or copper bullion carrying precious metals. To be precise, pig iron ought to come under this head; it is marketable as pig, but it must be cast, puddled, or converted into steel to reach its final commercial stage.

The variety of products is great, and to give the information fully would require discrimination in many products. For instance, some iron ores can be shipped directly to the furnace, while others must be crushed, washed, concentrated before shipment. If we must make the division, and if we are to ascertain values and costs—upon which values must depend—each step, the work is not only difficult but expensive. We require the services of experts to collect the information, to determine values and to apportion costs. Moreover, the time needed to classify, arrange and present the information would be so great as to postpone the publication of all statistics so long after the period they cover, that they would be valuable only as historical records.

There is another point to be considered here, and that is the difficulty of securing such information at all. In many mining and milling operations—especially the smaller ones—the costs of different stages of the operations are not carefully separated, perhaps not separated at all. Moreover, a great

many operators, while quite willing to give general results, would resent inquiries as to details as too much inquisition into their business. They would probably decline to give the necessary information altogether and would add largely to troubles of the statistician, already grievous enough.

Finally, there is the question of cost. The Mining Bureau is limited by its appropriation, which legislators are always inclined to cut down to the lowest point. The collection of detailed statistics, such as I have outlined, involves the employment of many men, some of whom must be experts who can command good pay; it requires much clerical help, and the whole expense would be decidedly beyond the means of most statistical bureaus.

I do not mean to depreciate the value of such information. For engineers, mine managers, and millmen, it would have the greatest interest. Practically, however, we must be limited by the means at our command. The Chief of the Mining Bureau and the private collector of statistics must each do, not what he wants to, but what he can do, with the means at his command. The possible result, unfortunately, comes too often—perhaps always—far short of what is theoretically desirable. Nevertheless, by such intelligent work, as is in our power, results of great use and benefit to the mining industry and the public can be attained—and, I believe, we are all trying to keep up to that standard.

## IRON PYRITES IN EASTERN ONTARIO.

(Specially Contributed.)

The production of iron pyrites first commenced in the early eighties, when a series of narrow lenses near Brockville were exploited, and the product obtained therefrom utilized locally in the manufacture of sulphuric acid. Phosphate found in the same locality was also utilized at this time, manufactured into superphosphate and marketed both locally and abroad. These deposits appear to have been narrow shoots of pyrite and calcite in gneiss, and in the year 1884, or thereabout, the deposits having become to all appearance exhausted, the acid works were obliged to import raw material from the vicinity of De Kalb Junction, in the State of New York. The Geological Survey, meanwhile, reported other occurrences of pyrite in Eastern Ontario, but no use was made of this information until seven years ago when a New York company commenced operations at a property near Tatlock, in the Township of Darling, Lanark County, upon which an option had been secured. Prospecting was continued on this property for some time before operations were discontinued, and work was then commenced on another prospect near the village of Bannockburn, in North Hastings, with satisfactory results, and a company known as the Madoc Mining Company was organized to operate the mine.



The property has been continuously operated for the past five or six years, weekly shipments being made to Buffalo and Cleveland, a production last year at the rate of 15 cars per week having been maintained. About three years ago the Madoc Mining Company commenced development operations at a property near Bogart, in North Hastings. The mine was steadily worked until the autumn of 1903, when some dispute arose between the owners of this and the adjoining property, as to the location of the boundried lines between the two. This matter having been at length settled, operations were resumed. In 1904 another property, near Queensboro, North Hastings, was worked by the British American Development Company. The property has since been acquired by a subsidiary concern known as the British American Pyrites Company, and for the past year development work has been in progress. The deposit, although not developed to the same extent as the Bannockburn and Bogart mines, promises exceedingly well. Development,

The ore is worth \$5.00 f.o.b. at Queensboro Station, half a mile distant from the property, and as this ore can be mined at a cost of about \$2.00 per ton, a considerable margin of profit remains. Recently arrangements have been made to build a spare line from the Bay of Quinte Railway to the property, which will save the cost of hauling the ore on wagons. Later advices inform us that the British American Pyrites Company has sold the dump of ore at the mine—equivalent to 600 tons—to the Contract Process Co., of Buffalo, at the rate of \$12.50 per ton, the sulphur contents being estimated at 45 per cent.

### AN ELECTROLYTIC METHOD FOR PRODUCING BICALCIC PHOSPHATE.

Mr. Wm. Palmaer, Director of the Electro-chemical Laboratory at the Technical College, Stockholm, Sweden, gives a brief account of an electrolytic method of producing bicalcic phosphate for use as a fertilizer out of unserviceable raw phosphate, this being published as an appendix to the Report of the Dominion Government Superintendent of Mines. In the hope that this new and cheap method may help to revive the now defunct phosphate industry in Canada, we reproduce in the REVIEW some of Mr. Palmaer's observations. After pointing out the fact—which is well known—that large quantities of raw phosphate occur which are not available for the production of superphosphates, either by reason of their low percentage of phosphoric acid, or on account of other drawbacks attaching to them, Mr. Palmaer proceeds to describe the method, which is protected by patent rights, as follows:—

#### I.—General Features of the Method.

up to the present time, comprises an 8 x 12 ft. shaft, which has been sunk to a depth of 75 feet through solid pyrite, for this distance, only one break having occurred when a wedge of talcose schist was encountered. This schist carries a proportion of ore, and if a roaster were installed at the property could be utilized to advantage. Surface crosscuts on the ground meanwhile indicate a large occurrence of ore, and this presumption is supported by favourable geological conditions in the vicinity. No ore has yet, however, been marketed, although there is now in the dump some 750 tons taken from the shaft, less than 20 tons of which are unmarketable product. The ore is granular and free from arsenic, a circumstance which is considered an advantageous one. It contains, moreover, about 50 per cent. of sulphur. The plant comprises steam drills and pump. The installation of an air compressor, and possibly a roaster, is however under contemplation.



Pyrites Mine of B. A. Pyrite Co., Queensboro, Ont.  
General View.

In an apparatus expressly adapted for the method, a solution of chlorate or perchlorate of sodium is electrolyzed. In the anode chamber an acid is thereby generated—chloric or perchloric acid—and in the cathode chamber a solution of caustic soda. The electrolysis is continued until a certain quantity of the dissolved salt has been separated into acid and alkali. The anode and the cathode solutions are led off into separate receivers. The acid anode solution is then allowed to work in a dissolving battery upon raw phosphate, in which process the phosphate is dissolved. Into the solution thus obtained the alkaline cathode solution is introduced, the while being meanwhile kept vigorously stirred, until the liquid bears evidence of a slightly acid reaction; to obtain that result, about half the cathode solution is required. In the process, bicalcic phosphate falls as a finely crystalline precipitate, which is drained off by filtration and washed. The filtrate, which contains one-third of



the lime originally dissolved, but hardly any phosphoric acid, now has added to it the remainder of the cathode solution, whereupon the greatest part of the lime in the solution is precipitated as hydrate; by the introduction of some carbonic acid the rest is precipitated as carbonate; the lime precipitation is allowed to settle. The solution remaining above it is then drawn off. The original electrolyte is regenerated by its means and enters again the electrolyzing apparatus.

## II.—The Raw Material and Its Utilization.

In applying the method, both phosphorites and apatites of very varying origin (e.g. those obtainable from Sweden, Norway and France, and also insular phosphate) have been employed. The percentage of phosphoric acid has varied between 9 and 40, corresponding to a variation of from 20 per cent. to 88 per cent. of tricalcic phosphate, without that, however, having any effect upon the course of the process. The raw material may be in a finely pulverized state, but not necessarily so, for raw phosphate has been used in lumps of a diameter of as much as 5 cm. The phosphate of lime present in the raw material is completely dissolved, provided, that is to say, that no grains of phosphate are embedded in silicates or other insoluble minerals, which may occur if the crushing has not reduced the raw material to fairly small-sized lumps.

Out of the amount of acid generated per ampere-hour, 1.33 grammes of tricalcic phosphate is dissolved. The voltage required is about 5 volts per cell. The phosphoric acid remaining in the solution, on the precipitation of bicalcic phosphate, is about 1 per cent. of that present originally in the raw material.

Of the silicates or iron ore (oxides of iron) mingled in the raw phosphate no appreciable quantity is dissolved.

If the raw phosphate contains carbonate of lime, it is dissolved by the acid simultaneously with the phosphate, chlorate (perchlorate) of lime, and carbonic acid being formed and the latter disappearing; consequently, the consumption of acid is rendered greater by the presence of the carbonate of lime, which is, from an economical point of view, a disadvantage. In this process, 1 per cent. of carbonic acid in the raw material involves practically the same amount of consumption of acid, or of energy, as 1 per cent. of phosphoric acid. On the subsequent addition, however, of the alkaline cathode solution, the same high-percentage bicalcic phosphate is precipitated. Consequently, an equally excellent fertilizer is obtainable out of raw phosphate containing carbonate as out of that free from it, though at an expenditure of more acid or of more electric current. In any case, by the electrolytic

method it will be possible to make use of raw phosphates containing more carbonate than is the case in the manufacture of superphosphate; on the other hand, they are not the most suited to be first resorted to.

## III.—The Nature of the Electrolyte.

With reference to the electrolyte, the salt used should be of such a nature that its acid may yield in conjunction with lime an easily soluble salt and of a kind which is not subject to change during electrolysis. As electrolytes solution of perchlorate of sodium or chlorate of sodium are suitable, or else mixtures of those salts, the presence of other salts, for instance chloride, in small quantities is of no account.

Both these salts are thoroughly suited to the purpose, perchlorate of sodium being the best that could be desired. Both chlorate and perchlorate of sodium are exceedingly easily soluble salts—1 part of chlorate of sodium being soluble in 1.05 parts of water at an ordinary temperature, while perchlorate of sodium is still more easily soluble; that is of importance, inasmuch as the washing of the precipitated bicalcic phosphate is thereby rendered considerably easier.

A slight loss of the electrolyte by spilling in the process of washing, etc., always occurs. The amount of that loss will not exceed a value of \$1.50 per ton of the finished article, if perchlorate is employed.

## IV.—The Composition of the Phosphate and Its Value as a Fertilizer.

The normal percentage of phosphoric acid ( $P_2O_5$ ) soluble by citrate, contained in the bicalcic phosphate produced by the electrolytic method, is about 34, irrespective of the character of the raw material. The quantity of the phosphoric acid soluble by citrate has been determined in accordance with the method officially recognized for that purpose in Germany. As the quantity of phosphoric acid soluble by citrate in the bicalcic phosphate obtained constitutes about 95 per cent. of all the phosphoric acid in the product the total percentage of phosphoric acid in the bicalcic phosphate works out at 35.8 on an average.

Extensive experiments in cultivation with the aid of bicalcic phosphate, prepared by the electrolytic method, have been carried out by Professor H. G. Soderbaum, Chemist to the Swedish Royal Academy of Agriculture. Exhaustive reports of the results of these experiments are to be found in "Meddelanden fran K. Landtbruksakademiens Experimentalfalt," Nos. 75 and 78 (1902 and 1903), and a report of experiments in the cultivation of oats is given in "The Experiment Station Record," edited by the United States Department of Agri-



culture, Washington, D.C., Vol. XIV., No. 10, pages 951-2 (1903). In these comparative experiments in cultivation the amounts used of superphosphate and bicalcic phosphate have been so determined, that equal weights were used, per superficial unit of soil, of phosphoric acid soluble by citrate from bicalcic phosphate and of phosphoric acid soluble by water from superphosphate.

The result of the experiments in cultivation is that the phosphoric acid soluble by citrate in the bicalcic phosphate proves to possess the same fertilizing value as the phosphoric acid soluble by water in the superphosphate, and consequently the same value as a trade product. The result might, indeed, have been foreseen, inasmuch as it is probable that the superphosphate in the soil is rapidly transformed into bicalcic phosphate through the agency of the compounds of lime present there. Retrogradation of soluble phosphoric acid in the bicalcic phosphate does not occur.

#### V.—Cost of Production.

In calculation of the cost of production per ton the following items are of importance:—

One electric horse-power produces in a year:

1.73 ton bicalcic phosphate of 36 per cent. soluble phosphoric acid;

Or, 1.95 ton bicalcic phosphate of 32 per cent. soluble phosphoric acid.

The percentage of soluble phosphoric acid will vary between 32 and 36 per cent., depending on the degree of dessication, etc. But under given circumstances a product of uniform composition will be obtained with a percentage of phosphoric acid from 32 to 36 per cent.; 95 per cent. of the total phosphoric acid will always be soluble by citrate.

The cost for chemicals is small, as they are re-generated.

As a by-product will be obtained about 1-3 ton of very good lime for every ton of bicalcic phosphate.

The capital needed amounts to something about \$65 per electric horse-power used in the fabrication when a plant of at least 2,000 electric horse-powers is supposed. In manufacture on a larger scale the capital needed will be comparatively smaller. In this calculation it is supposed that the electric power is hired, and consequently the cost for the electric power plant is not included.

#### VI.—The Superior Advantages of the Electrolytic Method.

The merits of the electrolytic method are as follows:—

(a.) It admits of the use of cheap low-percentage raw phosphate, not suitable for the superphosphate industry.

(b.) By it a phosphate containing about 34 per cent. of soluble phosphoric acid is obtained, even from low percentage raw material.

(c.) Freightage for a given quantity of phosphoric acid in the finished article is only about half that in the case of ordinary superphosphate.

(d.) Retrogradation of soluble phosphoric acid when stored does not occur.

(e.) The raw phosphate need not be reduced to a finely powdered state.

(f.) Bicalcic phosphate can be employed as a fertilizer on all kinds of soil, even on sandy and boggy land, where superphosphate is out of the question

#### ON THE EXAMINATION AND VALUATION OF MINES.\*

By JOHN E. HARDMAN, S.B., M.A.E., etc.

(Continued from June issue, 1905.)

But of all the precautions against salting and tampering with samples, none are known to be absolutely effective, and perhaps it is of equal value to the engineer to know whether tampering has been *attempted* at all. For this purpose a safeguard which I used over twenty years ago in Leadville, and recently mentioned by Mr. Rickard, is of value. This is to have a certain number of sample bags filled with waste, or with ore which has previously been accurately assayed out of reach of "salters," these bags are then mixed up with the regular sample bags. An assay from these dummy bags, made daily, or whenever suspicions arise, may reveal any attempt at extensive salting of samples. It is necessary to insist on the absolute exclusion from the assay office of every one but the assayer and his assistants.

The second system of sampling is to take out a large channel across the ore section by blasting it out with powder, subsequently trimming the edges of the channel with pick, or hammer and gad. It is used sometimes for ores that are so hard as to render the first method exceeding slow and laborious, or where the ore bodies present great and sudden variations in values, or where the deposit is very thick and contains thin streaks or layers of very high grade ore. The samples taken are necessarily large, varying from 100 lbs. to five tons, and the system cannot very well be applied to properties which are not fairly well equipped with crushing machinery for the reduction of bulk samples. It is unnecessary to say that the number of samples taken is very much smaller than by the first method, and that the approximation to the real value is not so close. The liability to salting is, perhaps, less.

A third system, applicable principally to milling ore, and to districts where an available mill is not

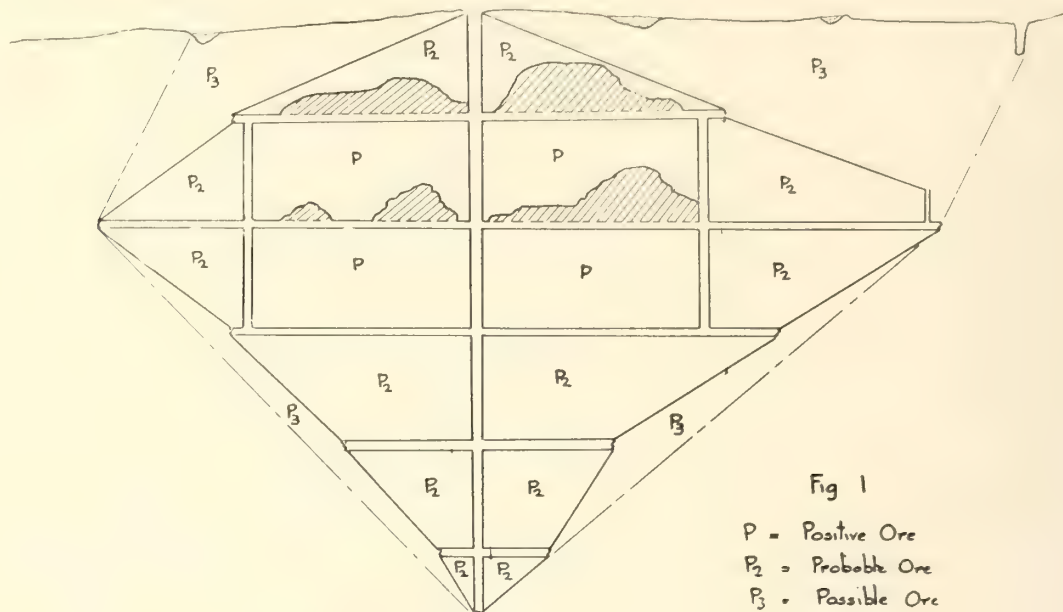
\* Trans. Can. Soc. of C. E.



too remote, is to blast out mill run tests, taking (necessarily) only a few samples, but each sample being of a large quantity or tonnage. Before taking such samples, the engineer should determine the approximate boundaries of the pay shoots, if there be any such, and their area should be roughly computed, and the ratio of their area to the whole

this class of ore, but it is not practicable in remote districts.

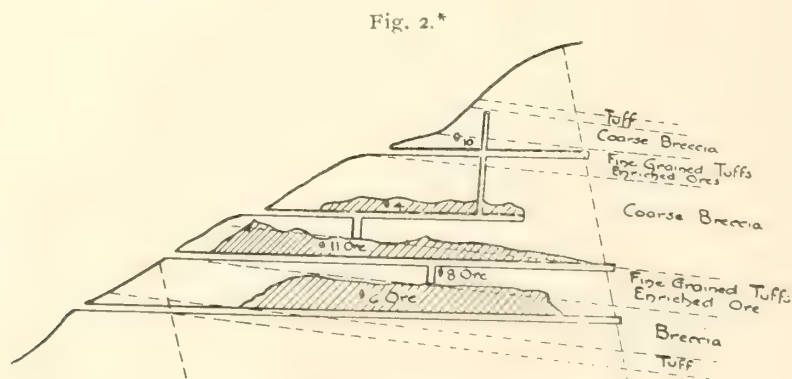
A tool which saves much time and labor in sampling under the first system, at mines which are equipped with an air-drill plant, is the Haessler-Ingersoll hammer, which weighs about twelve pounds, is fourteen inches long, has a stroke of



(See page 133, June number, 1905.)

area blocked out, determined. A few mill run samples should be taken outside of the vein which is known to be pay grade. The samples taken under this system will each be of at least five tons in amount, or perhaps much larger; they may be worked by the engineer himself or shipped to some mill or sampling works of whose honesty and independence the engineer is thoroughly convinced.

about three inches, and delivers up to about 300 strokes per minute. With an air pressure of sixty pounds, a channel one inch in depth and three inches wide can be cut in one-fourth to one-sixth of the time required by hand, and with little or no labor. The cuttings are finer than those obtained with hammer and moil, and there is less tendency for the rock chips to fly away to long distances; it is also



(See page 134, June number, 1905.)

The last system is not in frequent use owing to the difficulty in most cases of finding a reliable mill within a reasonable shipping distance of the mine. When time and cost are both permitted, it is, in some cases, much the more satisfactory method for

easier to trim the channel to exact dimensions. Wherever the rock is hard, the number of samples to be cut is large, and the property is equipped with a compressed air plant, the use of the air hammer will greatly expedite the work of sampling, and diminish the hard labor item.

\* From T. A. Rickard, Mineral Industry, 1902.



Some of the points connected with the work of sampling, upon which comments seem necessary, may now be noted.

It has already been stated that the object of sampling is to obtain a correct general average of the value of a block of ore reserves; since such ore reserves can only be sampled on exposed faces, it follows that the smaller the block from which samples are taken the greater the approach to accuracy. Large blocks of reserves, therefore, must be examined with great thoroughness. If such blocks are penetrated by winzes, upraises or drifts, these openings will give a chance to note any variations in value as the centre of the block is approached. If there are no such openings, the list of assays must be searched to detect, if possible, the existence of streaks, either high or low in grade, running through the block.

It is unwise to attempt to set arbitrary limits to the extent of blocks of reserves, the conditions attending being so diverse. One must be guided

by assay, and a distance of three feet in width, or laterally, between two samples, may show values ranging from \$2.50 per ton in the one assay to \$25 per ton in the second assay. In one case it is possible that samples may be taken from a longer stretch than the values would justify stoping, or, in another case, if the sample be cut across the full width of the pyrrhotite showing, its full value may be greatly reduced.

The writer has met with the same possible error in sampling some auriferous saprolites in the Southern States. In the figure shown (No. 3) the width between walls is 60 feet, all of which was extracted and worked by previous owners as "ore."\* Preliminary sampling showed values were not uniformly distributed, but were segregated along two lines; the face, therefore, was sampled in the manner shown in Figure 3.

As to the distribution of sample lines and the intervals between them, something has already been said showing that distribution of values and widths

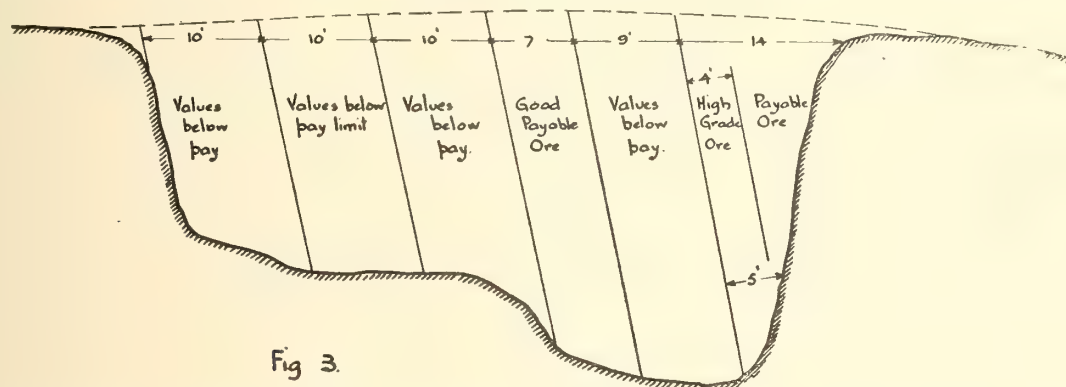


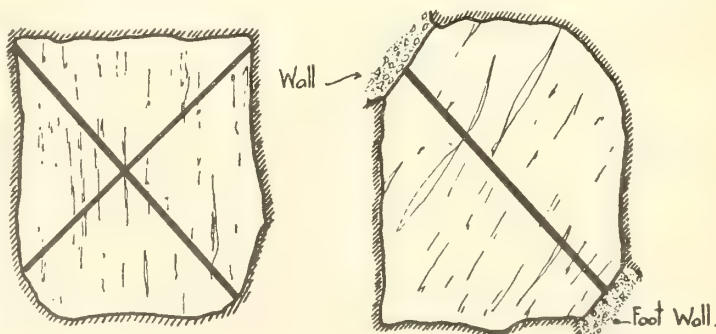
Fig 3.

by the record of the stopes which have been worked out, and which may show whether payable portions of the deposit have been erratic in form and extent or regular and uniform. Among the figures the writer finds given by other engineers, the greatest allowable dimension for height appears to be 100 feet, but (it may be stated) with a strong preponderance of opinion for 60 feet as the permissible limit; the greatest length allowable is 200 feet; this would make the maximum unpenetrated block permissible one of 100 feet by 200 feet. The writer does not care to set limits personally, believing that such must be governed by the character, past history, and previously noted peculiarities of the deposit.

A possible source of error arises occasionally out of the practice of taking assay samples at irregular distances, without having first determined by trial samples the extent of the ground to be regarded as "pay ore." The possible error is chiefly confined to deposits in which the pay ore is indistinguishable to the eye from ore that is barren or very low grade. For example, the pyrrhotite ores of the Rossland, B. C., Camp present no reliable way of distinguishing poor ore from rich except

of ore bodies are governing factors. To this should be added the statement that in the case of very rich ores the sample lines must be much closer than with low grade ore ores. Care must be taken that the samples cut shall impartially represent the full section taken, and to facilitate such impartiality it is often advisable to have the section trimmed to a good face before cutting the channel for the sample.

In sampling the ends of drifts or levels, where a good cross section cannot be obtained, the sample, as an alternative, may be cut crosswise, or as an X, thus:—



\* Bonner Mine, Carrollton, Georgia.



In sampling shafts, care must be observed that the section is complete, just as in a stope or level, and this point is specially mentioned because the sampling of a shaft is almost always slow and tedious on account of the delays caused by the rigging up of temporary scaffolds or platforms from which to cut the samples.

In the sampling of very wide deposits, having a nearly horizontal position, it is advisable to cut the samples in sections, as was indicated in the case of the wide, nearly vertical, saprolite deposit occurring in the South, only in this latter case the sectional or dividing lines should be practically horizontal. As an instance, one may mention the galena deposits at Bonnetterre, Mo., and some of the silver-lead and copper deposits in the region of the Grand Canyon in Arizona.

Mention should be made of some cases in which it is necessary to sample ore that has already been broken, or is coming daily from the mine. When the ore is coming out daily, one or more shovelfuls should be taken from each car or bucket hoisted, these shovelfuls being thrown into a separate car or pile to be broken or reduced to the proper size and then cut to a smaller sample; if the ore already broken lies in piles or in bins, it is best sampled by removing to another pile or bin, taking out each tenth shovelful for a sample; this process is slow, expensive, and not often necessary.

In sampling ore already sacked for shipment, a sample of a few pounds may be taken from the top of each sack; or better, each fifth or tenth sack may be dumped on a sampling floor to make the sampling pile, which is subsequently quartered down, and the portion not wanted filled into sacks. If a big dump of ore or waste requires to be sampled, it may be roughly done by taking one or more shovelfuls from each point marked in the scheme, a usual scheme being to draw equidistant lines at right angles to each other over the dump or pile, and to take a sample at each point where the lines intersect.\* A better method is to cut a trench right through the pile or dump, casting each tenth shovelful aside for the sample.

If a dump of mill tailings or sand requires sampling, it is usually done by crossing it with equidistant lines at right angles, as in the case of dumps above mentioned, the sample being taken with an auger, or with a piece of inch and a half or two-inch pipe, driven through the sand to the bottom, or to any determined depth.

The relation of the maximum size of the particles of ore to the bulk of the whole sample is a matter which was ably treated by Mr. E. B. Kirby† some nine years ago.

While the samples are cutting, the engineer, or an assistant with some knowledge of compass surveying, should make sketches of the workings as the sampling proceeds. He should locate the position of each sample taken, giving it a number in his sketch; should note increases or decreases in width of vein, changes in character of vein filling, occurrence and position of feeders or "angulars" coming in, and their effect; note the timbering, and any places "walled up" without any obvious reason; in short, he should prepare full notes of the underground geology *as he sees it*, with a record of all unusual, inexplicable or suspicious appearances.

As to precautions against tampering with samples, or salting, allusion has already been made to such, and to attempt a catalogue of the possible devices against which one must guard, would encumber this paper and probably be profitless. Nevertheless, the engineer (or assistant) who is noting the underground geology should keep his eyes open for detection of faces of work which have been stopped while yet in good ore, though other facts give a presumption that a few feet will break into poorer rock; old workings, possibly honeycombing what are called "reserves," carefully walled up or concealed by a few stulls and lagging, the reason for whose being is given perhaps as "a bad place in the roof"; sumps (in levels) which are suspiciously full of water, and which likewise may conceal openings in the block of ground below, which, if inspected, would show that it had been "gutted"; long, but low, stopes showing no ore in the roof may be intended to convey the idea that the ore occurs in a long shoot, therefore falsely giving to a small and isolated ore body the semblance of a larger and extended ore shoot. To quote a phrase from Mr. Rickard—"Experience, silvered with age" is the best insurance one's client can have against the many and ingenious devices made by our fellow men to deceive and entrap the examining engineer.

### Preparation of Samples.

The size of the samples taken is dependent on the method employed, many small ones in the case of the first system, and individually larger ones in the third and second systems; the importance of the examination (financially) and the complexity of the ore also govern.

With ores of a simple character, such as free gold ores, working tests of large samples are always to be preferred to small samples, if possible. Every engineer of experience in free gold ores has known the doubt he has felt as to whether a small sample actually represented the true value of the vein where it was taken; a free gold ore carrying \$10 to the ton is good pay ore anywhere, yet this value represents only 240 grains of gold distributed through one ton or 14,000,000 grains of vein matter.

\* In the case of the seven large dumps at the American Sisters Mine, Colorado, these lines were spaced 20 feet apart, and the sample was taken from the centre of each 20 feet square space.

† Proceedings of Colorado Scientific Society, December, 1894.



As, in many cases with free milling ore, particles of gold *may* weigh more than one grain rather than less, what are the probable chances of obtaining an aliquot portion of such gold in a five-pound sample, as compared with a 500-pound sample? Or, what is more nearly the case, in an assay ton weight? Mathematically, the chances are very slight with the majority of gold ores, and hence arises a well-founded objection to the fire assay as a means of determining the value of free milling gold ore where the gold is "spotty," or inclined to coarseness rather than to well disseminated, very minute "dust."

With sulphuretted ores, which are more common, as for example with the Rossland pyrrhotites, and the pyrites and chalcopyrites of Colorado and Montana, a five-pound sample taken at regular and frequent intervals is a much better guide than 1,000-pound samples taken infrequently.

Each sample taken with the moil and hammer should first be broken to pieces of an approximately even size, such as to pass any screen with three-quarters of an inch meshes. It should then be thoroughly and completely mixed on a sheet of rubber or oilcloth and quartered. There has been a just criticism of the practice of mixing a sample by rolling it on a square of canvas, the point being taken that the fines accumulate immediately on the canvas and do not roll over and get mixed with the coarser particles, but simply slide back and forth beneath the coarse stuff. When the sample, by quartering, reaches the size of three or four pounds, it is best to use a "split" shovel, or a riffle shovel. In this way the five-oz. sample required is correctly obtained. This sample can then be put into a wide-mouthed glass bottle or tin case and sealed; it is then ready to be shipped away to an assay office, or can be kept for assay on the spot.

The preparation for samples taken by the second system demands the use of machinery on the spot for their reduction to a convenient size, and in such a case extreme care must be exercised to have the crushing machinery, screens and receiving bins absolutely clean and free from dust of other ores. As to precautions against salting, and against the outside labor sometimes necessary, each circumstance will present its own conditions to which the engineer must apply his remedy.

When the ore, broken in the stopes, requires its richer or poorer portions to be sorted, or cobbled out, in order to make a marketable product, or to facilitate good work in a subsequent mill treatment, the sampler has to determine the respective percentages of weight and of value in the different portions. This he may do by making careful sorting tests himself upon the samples he has cut, or, better perhaps, by having an experienced ore sorter of the mine sort the samples under his immediate supervision. The products of this sorting of each

sample are then put into separate packages and labelled; afterwards they are carefully weighed to determine percentages, and assayed for values; circumstances will determine whether each product requires to be assayed separately, or whether a number of such products may be combined and quartered down for the assay sample.

In sampling, the engineer has under *immediate* consideration only the taking of an accurate cross-section of that part of the ore body which is exposed at each point where a sample is cut, whether the width of that cross-section is one foot or ten feet, and for many purposes of his investigation, the width is immaterial. But in many ore bodies of a minor character, this cross-section is far too narrow to be removed or mined by itself, and more or less waste rock will become mixed with the ore. In the gold quartz veins of Nova Scotia, which are locally known as "whin-bound," or "frozen," the quartzite ("whin") adheres firmly to the vein quartz, and in many cases which have come under the writer's personal notice the ore going to the mill has contained more than fifty per cent. by weight of barren quartzite. In other of the gold veins of that same province, the casing is a soft chlorite or talcose slate, very brittle and friable, and a very considerable percentage of barren rock finds its way into the mill, and reduces the returns per ton below the assay figures gotten from clean samples. Hence the use and value of sorting tests before calculating values.

In all cases where the ore is too narrow to be removed without breaking barren rock, or where ore is frozen to barren rock, or where the ore is accompanied by a brittle, friable, barren casing or "gouge," which is not economical or feasible to separate, the values obtained from clean samples must be modified by the results of the sorting tests before they are used in calculating final results.

It will be seen that the process of obtaining the average assay value of ore reserves is very tedious, and liable to many errors; its value, as a factor, is dependent on the skill and personal equation of the sampler. So clearly is this recognized by engineers that the higher authorities have a practice of retaining in their employ men who possess this skill at its greatest, being disinterested and impartial, and, one might almost say, automatic.

(To be continued.)

The Buckingham *Post* makes the following rather neat and amusing reference to the recent Anglo-Canadian Graphite Syndicate fiasco:—

"It is understood that the Anglo-Masson Dumfuss Co. are about to acquire all the rights and privileges of a graphite company recently defunct, with gorgeous array of closely related mourners. The prospectus will, we understand, read something like this,—we're not referring to the preamble, which



we understand on good authority is of roseate hue enough to put the danger signal on the rear of a fast express to shame.

"Capital Stock, \$1,000,000, in 10,000 shares of \$10 each. (This ought to appeal to wood choppers and workingmen generally.)

"Plant . . . . . \$25,000.00

"Stock, mostly unpaid for . . . . . 3,000.00

"Working Capital, partly subscribed. . . . . \*.22

"The people of Buckingham are not straining their backs in the frenzied desire to secure stock.

"\*Cannot vouch for the amount, it may be less.

"Parties who have entered suits against the late unlamented Graphite Syndicate are meanwhile

among those who get the judgment is eagerly awaited. It is said that the English capital subscribed for experimental operations is not quite expended, and there remains a tidy sum of some thousands. Could this sum be "collared" on a Canadian Supreme Court judgment?"

## THE IRON ORE RESOURCES OF NOVA SCOTIA.

(From Our Special Commissioner.)

"Londonderry" pig iron, or as it was formerly known, "Siemens," has always had the highest possible reputation throughout Canada and has been used for many years in all classes of work. For



The Londonderry Iron & Mining Company's Cast House

authoritatively informed that the Syndicate will not defend the actions, and it is therefore asked whether the transfer of the property to another Company in which the directors of the defunct Syndicate are associated as members has anything to do with this decision, if it has been arrived at. We do not imagine that a suit for over \$2,500 has been entered merely for the fun of the thing, and we are very curious to learn what motive underlies the action. The distinction the law will necessarily have to make when apportioning the Syndicate's assets

example, castings made from this metal have been specially noted for great strength and soundness, combined with softness, and these facts are generally known to everyone conversant with the iron trade throughout Canada.

So far as the Londonderry deposits are concerned, the ore bodies, owned by the Londonderry Iron & Mining Company alone, extend from the DeBert River on the east to the Portapique River on the west, a distance of about twelve miles or more, assuming the form of a series of true fissure veins.



Following the south slope of the Cobequid Mountains and extending to an undetermined depth, the total quantity of this great deposit is scarcely possible to calculate, but explorations and operations carried out by the present company have proved to their satisfaction that the deposit extends into many millions of tons. The ores obtainable are specular ores of great purity, carrying from 64 to 69 per cent. of metallic iron, which run in irregular pockets throughout the formation, the main body being, however, limonite or brown and black hematite ores lying usually between well defined walls. These ores carry from 45 to 56 per cent. metallic iron and are especially valuable on account of their low sul-

the Londonderry Iron & Mining Company is drawing from these mines between six and eight thousand tons per month to meet their regular requirements and could increase this output at any time if it was necessary, it being simply a matter of increased mining facilities. The Cobequid hills, through which these veins run are broken by ravines and gorges, so that adit mining is always practicable and the ores are thus easily attained and most of the mines are self draining.

Apart from the iron ore deposits the vein matter consists chiefly of ankerite and siderite, which are used for fluxing, doing away with the necessity of the use of limestone and having the added advan-



Coke Ovens at the Londonderry Works.

phur and phosphorus contents and easy fusibility in furnace practice. The brown and black ores from these veins run largely between 50 and 56 per cent. in iron with silica between four and six per cent., phosphorus about .015 and sulphur from .008 to .027 and manganese varying from .30 to .90.

Further, in regard to the quantity of ore, the highest independent authorities have estimated these deposits as being capable of yielding a supply for many years to come, even if drawn upon to a much greater extent than heretofore. At present

tage of carrying from 12 to 20 per cent. of iron. The Londonderry Company can, therefore, operate its plant at a much increased output without drawing at all from foreign sources, and as already pointed out is producing a class of pig iron that is suitable for the highest grade of castings.

So far as the bodies of ore in the Annapolis Valley are concerned, the Londonderry Company has used ores from that district in combination with their local ores and the present company having handled between twenty and thirty thousand tons



of Torbrook ores, while the old company handled an amount far exceeding that, so that the question as to the suitability of these ores can easily be determined and proven.

First, as to the cost of mining, Torbrook ore can be mined at as low or lower cost than any other suitable quality of iron ore obtainable in Canada, and, further, it is probably the cheapest ore to break underground on this continent. As to the quality, the average of the ore taken from that district for some years past yielded between 52 and 55 per cent. in metallic iron with the silica running from about eight to eleven per cent. In the case of the high silica it was mainly a matter of mining and could have been easily overcome by more careful clobbering at the mine. As to the extent of the ore deposit, the

workmen. Taking an average run of ore mined and delivered from Torbrook, I find that the iron contents averaged between 52 and 54 per cent., the silica from 7.94 to 11 per cent., mainly below ten per cent., the phosphorus from 1 to 1¼ per cent., manganese .150, lime about 2.50 to 3.50 and sulphur from .010 to .035. The ore is a red hematite and free smelting, and any one conversant with iron ores will readily admit that the quality is more than equal to the average class of ores that are being imported.

#### THE U. S. TARIFF ON ZINC ORES.

The following letter, addressed by Mr. L. M. Shaw, Secretary of the United States Treasury, to Senator Stone, on the above subject, has been made public. Mr. Shaw writes: "With reference to the tariff on zinc ore, I beg to say that I have no doubt of the correctness of the following propositions:

"First—Lead-bearing ores, within the spirit of the law, must bear sufficient lead to justify its reduction for the retention of this lead. From the best information available it appears that 4 per cent. of lead is sufficient to justify its reduction and retention. Instructions will therefore follow not to consider as lead-bearing ores, such ores as bear less than 4 per cent. of lead.

"Second—I have no doubt that calamine zinc is entitled to free entry, for the statute so provides.

"Whether sulphides of zinc are free or dutiable is by no means easily determined. Section 614 of the Dingley tariff act, included in the free list, reads as follows:—

"'Minerals, crude or not advanced in value or condition by refining or grinding or by other process of manufacture not specially provided for in this act.'

"This section relates to minerals of all kinds, and includes sulphates of zinc. It would therefore appear that sulphide of zinc in its crude form should be admitted free. Unfortunately, however, Section 183 of the same act appears to be in direct conflict, for it reads:—

"'Metallic mineral substances in crude state and metals unwrought, not specially provided for in this act, 20 per cent. ad valorem.'

"Sulphide of zinc is a metallic mineral substance, and in its crude state would seem to be dutiable at 20 per cent. Section 614, the free section, refers to minerals generally, and includes metallic substances, as well as every other character and kind, while Section 183 relates solely to metallic mineral substances. The unfortunate feature of the ambiguity arises from the fact that the free section includes the dutiable substances when not specially provided for. If it were reversed, and the dutiable section referred to all minerals and the free section to metallic substances, it could be easily solved. I reach the conclusion that the proper tribunal to interpret these two apparently conflicting sections is the court, and the only way to present the case to the court is to exact duty on sulphides of zinc. The importer can protect his rights, and the government's rights will be protected. Instructions will therefore follow accordingly."

In commenting on the above letter Mr. J. R. Holmes, chairman of the committee appointed to defend the interests of the producers of the Joplin District, in the event of an appeal in the case against the importations of foreign zinc ores, remarks:—

"The above is the first definite and authoritative statement issued by the treasury department and emphasizes the importance of the steps taken by the district committee to raise funds for the prosecution of these matters in the courts, and secure the enforcement of their interpretation of the tariff laws. The necessity of immediate action is so apparent that it does not admit of argument.

"All the preliminaries of engaging counsel, securing witnesses and securing funds should have been taken even before this time, and it is not too late even now, but no more time should be wasted in idle talk. The decision of the treasury department that lead-bearing ore must contain 4 per cent. is far from satisfactory. This ruling would only impose a duty of \$1.20 a ton as against \$5 under the ad valorem clause. It is difficult to see the reasons on which such a ruling is based and the committee is unanimously of the opinion that it can be reversed either before the general board of appraisers or the United States Circuit Court, if the proper effort is made at once.

"That portion of the ruling which refers to crude ore is not considered important as no crude ore will be imported, though attempts may be made to ship concentrates as crude ore, and if so, they will be inevitably defeated. In his reference to calamine, Secretary Shaw has overlooked or failed to see the point made by the committee, which visited Washington. The committee admitted that calamine was on



The Londonderry Iron & Mining Co.'s Pine Brook Quarry.

possible quantity has been placed as high as one hundred million tons and this by very good authorities, but it is certainly easy to prove that there would be at least one-tenth of this quantity or ten million tons in the district mentioned, of ore of the quality referred to.

At present, working in a small area the Londonderry Iron & Mining Company has been taking out for its own requirements two thousand tons per month. This will shortly be increased to about four thousand tons per month, and if there is the demand for the ore it can be increased to an output of one thousand tons per day or more, it being simply, as in the case of Londonderry, a question of a mining operation, or, in other words, increasing the mining facilities by additional development, plant and



the 'free list,' but protested against the admission of carbonate of zinc under the name 'calamine.'

"The committee is positive that the decision of the general board of appraisers rendered May 8, that carbonate of zinc is properly termed calamine, and hence not dutiable can be successfully attacked, but do not mean the retention of high-class legal talent, the employment of expert chemists and assayers, payment of their expenses, etc.

"It may be that the importers of ore will be satisfied with these rulings, and if so, it will be for the producers to seek their remedy in the courts. No time should be lost, for delay might be construed as sleeping on our rights and so forfeit our standing in court.

"Let the soliciting committee now go actively to work, and all interests give them liberal support. On the speedy completion of this work will depend in a large measure the continued prosperity of this district."

### THE BOUNTY ON STEEL RAILS.

Just as we go to press it is announced that an order-in-council has been passed providing that the bounty on steel manufactured in Canada shall not apply to steel rails. This, if true,—but as yet there has been no official confirmation of the intelligence—will naturally seriously affect the interests of both the Lake Superior Corporation, at Sault Ste. Marie, and the Dominion Iron & Steel Company at Sydney.

The bounty on steel rails which has been in effect up to this time, amounts to \$3 per ton, and as the works at the "Soo" are manufacturing rails at the rate of 500 tons per day, and the works at Sydney at the rate of 350 tons per day, the loss in revenue to the two companies in question by the change will approximate \$2,550 daily.

The act under which a bounty of \$3 per ton on steel rails was claimed and successfully maintained was brought down on August 4, 1903. At the same time a bounty was also provided on other manufactured articles such as wire rods, beams, joist channels, etc., as well as upon pig iron and steel ingots. The act reads as follows:—

"The Governor-in-Council may authorize the payment of the following bounties on the undermentioned articles manufactured in Canada from steel produced in Canada from ingredients of which not less than fifty per cent. of the weight thereof consists of pig iron made in Canada, viz., On rolled round wire rods, not over three-eighths of an inch in diameter, when sold to wire manufacturers for use in making wire in their own factories in Canada, a bounty of six dollars per ton.

"On rolled angles, tees, channels, beams, joist girders, or bridge building, or structural rolled sections, and on other rolled shapes not round, oval, square or flat, weighing not less than 35 pounds per lineal yard, and also on flat eye bar blanks, when sold for consumption in Canada, a bounty of three dollars per ton."

The contention was raised by the Lake Superior Corporation and subsequently upheld that the words "and other rolled shapes not round, oval, flat or square, weighing not less than 35 pounds per lineal yard," clearly meant that the bounty of \$3 per ton applied to steel rails.

### A GOVERNMENT REPORT ON B.C. ZINC RESOURCES.

It is reported that Mr. W. R. Ingalls, the well known American authority on zinc, has been retained by the Canadian Government to report on the zinc resources of the Kootenays in conjunction with a Canadian engineer, whose name will shortly be announced. British Columbian producers have asked that the examination be made on the following lines:—

1. To obtain a report on the districts from which zinc ores are now being produced; the character and tonnage of such ores; the methods employed in their production and local reduction; cost of mining and local reduction; where marketed and at what cost, with freight charges.
2. To obtain an estimate and report on the tonnage and character of zinc ores which have been made available for production by mining development; and a report on local economic conditions, such as transportation facilities, which will govern their production.
3. To obtain a report on the location and, from an economic geological standpoint, the probable future of the undeveloped deposits; the local economic conditions, such as transportation, which will affect production therefrom; the character and metallic values of the ores so exposed; and analyses of ores, either taken by the expert making the examination, or under his direction, and of ores submitted for analysis by prospectors and claim owners.

### COAL TESTS.

The Welsh coal producers, with a view to a possible market in Canada, some six months ago procured, through the Toronto Branch of the Canadian Manufacturers' Association, samples of six varieties of coal used in Toronto for

analysis. The report of Mr. Llewellyn J. Davies, F.C.S., of Cardiff, who made the tests, has just been received at Toronto. The figures he gives are as follows:—

| Chemical constituents.                | Description Furnished with Sample. |           |              |              |                |             |
|---------------------------------------|------------------------------------|-----------|--------------|--------------|----------------|-------------|
|                                       | Stove coal.                        | Pea coal. | Hard scr'gs. | Soft scr'gs. | Maclin scr'gs. | Steam coal. |
|                                       | %                                  | %         | %            | %            | %              | %           |
| Fixed carbon. . . . .                 | 84.43                              | 81.63     | 75.17        | 55.47        | 55.40          | 60.63       |
| Volatile matter. . . . .              | 3.77                               | 5.22      | 5.13         | 31.88        | 33.55          | 31.87       |
| Ash. . . . .                          | 7.80                               | 9.10      | 15.50        | 10.50        | 4.20           | 6.10        |
| Water. . . . .                        | 4.00                               | 4.05      | 4.20         | 2.15         | 6.85           | 1.40        |
| Total. . . . .                        | 100                                | 100       | 100          | 100          | 100            | 100         |
| Sulphur separately estimated. . . . . | .067                               | .085      | .095         | 4.06         | 1.21           | 2.40        |

### MINING MEN AND AFFAIRS

Mr. R. S. Broadbent, who is in charge of Canada's mineral exhibit at the Liege Exposition, has been informed of his appointment as a member of the International Jury on Mines and Metallurgy.

Mr. Alex. Dick was recently appointed general sales agent of the Dominion Coal Company. Mr. Dick will, it is announced, have sole control of the disposal of the entire output of the collieries.

Dr. H. M. Ami, of the staff of the Geological Survey, is preparing a special report for the Government describing the territory along the proposed route of the Grand Trunk Pacific, between Winnipeg and the Pacific coast.

Mr. T. A. Rickard is now in Nova Scotia to examine the gold mining districts in the province with a view to undertaking the preparation of a comprehensive report on the gold measures for the Provincial Government.

We have received from the secretary a notice that the autumn meeting of the Iron and Steel Institute will be held at Sheffield, Eng., on the 26th, 27th, 28th and 29th of September. An interesting programme has been prepared.

Mr. A. B. W. Hodges, general superintendent of the Granby Consolidated, anticipates that by the middle of August, eight furnaces will be in operation at the Granby works, allowing of the treatment of 2,700 tons of ore daily.

At a meeting of the Board of Governors of Dalhousie College, Mr. E. Brydone Jack, C.E., was elected professor of civil engineering in the place of Prof. Dixon, who has accepted the chair of civil engineering at the University of Birmingham.

Major R. G. Edwards Leckie, who is well known to a number of our readers, recently paid a visit to British Columbia. Major Leckie is now associated with a London syndicate which has secured extensive concessions in Eastern Somaliland.

An order-in-council has been passed at Ottawa, providing that dry white lead, orange mineral, and dry red lead produced from Canadian ores and pig lead made from Canadian bullion, on entering Canada shall now pay duty on the full value of the article.

Mr. Jas. Floyd, of the Intercolonial Coal Company, Westville, has been promoted to the management of the company, in succession to Mr. Chas. Fergie. Mr. Floyd has had a long experience and is regarded as a highly competent and well qualified colliery manager.

Mr. T. Hayes Sheen, of London, Eng., representing the Lancaster syndicate, is visiting Ontario in connection with the operation of the Bruce mines. Meanwhile, a new company, known as the Copper Mine and Smelter Co., of Ontario, Ltd., has been organized, with a capital of £200,000.

Messrs. H. H. Claudet and L. C. Wynne have purchased Mr. R. Marsh's assaying business in Rossland, and are opening offices on Columbia Ave. The firm intend making a specialty of control and umpire assaying, this work being in charge of Mr. Wynne, who was formerly assayer for the Le Roi Mining Company.

The death occurred at Brockville, Ont., on July 25th, of Major J. M. Walsh. In 1883 Major Walsh established the Dominion Coal, Coke & Transportation Company, doing much towards developing the coal resources of the Souris district in Southern Manitoba. In 1897 he was appointed Commissioner of the Yukon, which position he filled with great success.

The annual outing of the Engineers' Club of Toronto took place on July 28th. The excursionists travelled by steamer to Burlington Beach, thence by special electric car to Hamilton, where the works of the Hamilton Steel & Iron Co., the International Harvester Co. and the Cataract Power Co. were visited. The party was in charge of Mr. W. Chipman, the secretary.

Mr. Carl R. Davis, formerly superintendent of the Centre Star and War Eagle mines, is now superintendent of a gold mining company in South Africa. In writing to a friend in Rossland, recently, he states that his company is employing no less than 2,400 men of which the greater number are Chinese and natives. Mr. Davis speaks most enthusiastically of South African mining possibilities.



eral output of this territory, the government is prepared to do everything in reason to bring such a system about. Two years ago the Dominion government granted two and a half million dollars to develop the lead industry in British Columbia. It revived the lead industry greatly there, and it would revive the mining industry here if the government was to take steps to furnish water to the miners."

The American Institute of Mining Engineers was most hospitably entertained during its recent visit to Dawson, and members of the party were given every facility to visit the mines. Before leaving a banquet was held in honour of the Institute, each visitor being presented with a souvenir gold pin, of which the design represented a miniature gold pan, pick and shovel, inscribed with the date, "1905."

The Customs officers in the mining districts have received notice that part of item 455, schedule B, of the Customs Tariff, 1897, and subsequent Acts, relating to mining machinery, has been amended as follows: "The exemption from duty of machinery and appliances of a kind not made in Canada for use exclusively in alluvial gold mining, authorized by section 12 of the said chapter, is extended from July 1, 1905, to June 30, 1906."

The annual session of the Nova Scotia Summer School of Science was held last month at Yarmouth. Among the visitors were the president, Mr. J. D. Seaman, of Charlottetown; Mr. W. R. Campbell, of Truro, Secretary; Dr. G. U. Hay, of St. John, botany; Dr. Andrews, of Mt. Allison, chemistry; Dr. L. W. Bailey, of Eaton, geology and zoology; Miss Eleanor Robinson, of St. John, English literature; Principal Sloan, of the Normal School, Truro.

The Rossland Miner states that excellent progress is being made with the structural geological survey of the camp by Professor Brock and his able staff of assistants. Mr. Brock is devoting his energies just now to the underground workings of Columbia and Kootenay Mountain, having finished his examination of White Bear flat and vicinity. Mr. Young is busy with the geology of Red Mountain while Mr. Boyd is preparing a map of the country embracing the big working mines.

The Vancouver World quotes that "the Granby Co., recently, sent the Laborers' Cooperative Gold, Silver and Copper Mining Company of Golden, a check for \$770.44, being the returns from the small shipment of matte received from the company's smelter at Golden. The officers of the company with the lengthy name were so tickled to get so much money all at once from their own mines and smelter that they had a photo-engraving made of the check and printed on the first page of the Golden Star."

The report is general that the National Lead Company, of New York, is about to take steps to establish a lead corroding plant in Montreal. The National Lead Co. is the largest amalgamation of lead-corroding interests in the United States and is generally known as the white lead trust. On June 26 last it increased its capital stock from thirty millions to fifty millions of dollars, one-half preferred and one-half common. The company owns a dozen large corroding works at different centres of the paint trade.

Mr. Howard DuBois, of the firm of DuBois & Mixer, mining engineers of Philadelphia and Salt Lake City, is again visiting British Columbia with a view to investigating the platinum resources of the province. Prior to 1896 some \$20,000 worth of platinum was produced in the Similkameen district, but since that time the annual output has decreased to an inconsiderable amount. It is said that in connection with hydraulic mining in Cariboo and Cassiar platinum may be saved by the installation of special appliances.

M. De Romeau, an eminent French geologist, is, as we mentioned last month, visiting Canada with a view to investigate our corundum deposits. He recently spent two days in Toronto in conference with Mr. Craig, of the Canada Corundum Company, and Mr. T. M. Gibson, Director of the Bureau of Mines, afterwards proceeding to Newfoundland. On his return he will visit the mine and mill of the Canada Corundum Company at Craigmont. As a considerable amount of Canadian corundum is exported to France, this investigation is of more than ordinary significance.

Mr. Thos. Kiddie, manager of the Tye Copper Co.'s smelter at Ladysmith, V.I., has established a most successful record in the operation of that plant, and it may be confidently stated that, notwithstanding the refractory character of the Mount Sicker ore, which contains a considerable percentage of zinc and barite, he has reduced his costs to below those of (for example) Rossland. Mr. Kiddie has also, in the face of strenuous competition from the Tacoma smelter and other American smelting works, succeeded recently in securing contracts for the treatment of copper ores from Alaska, in American territory.

After leaving British Columbia, the members of the American Institute of Mining Engineers who attended the Victoria meeting took the steamer for the north. A stop was made at Port Simpson, and, later, at the famous Treadwell mine, on Douglas Island, where a visit was paid to the deep-workings some six hundred feet below sea level. From Skagway the party travelled to White Horse, on the Yukon & White Pass Railway, whence they transferred to a steamer on the Yukon River, ultimately arriving in Dawson. Here they were received by the Commissioner and other officials, and most hospitably entertained. The party was driven to

the Dome, which commands a magnificent view of the Yukon watershed, while a number of the principal creeks were also visited.

When negotiations are in progress for the sale of mining properties strange things sometimes happen, the Toronto Telegram remarks. A rather remarkable series of incidents is revealed in the judgment given by Mr. Justice Meredith in the McConnell vs. Lye case. Rinaldo McConnell is an Ottawa miner. He made a purchase of mining lands from Henry Lye, of Vancouver, for \$3,600. McConnell subsequently wished to drop the matter. Lye took steps to compel McConnell to complete the purchase. When McConnell agreed to do this Lye decided not to sell. McConnell thereupon entered suit, and Judge Meredith decides that Lye must deliver the lands.

Mr. Goodale, the well-known metallurgist of Butte, Montana, recently visited the Boundary district of British Columbia, of which he expressed the following opinion as reported by the Phoenix Pioneer: "I am deeply impressed with the possibilities of the mining industry in British Columbia. There is every reason to believe that the output of the mines of the Boundary District will, before many years, rival that of Butte in regard to tonnage. Nature has not been so considerate at Butte. The values of our mines are higher, of course, running from \$9.36 to \$12.85 per ton, but we have to bring our lime for fifty miles at a cost of \$1 per ton. Taken altogether, and remembering that we have to roast our ores, we have more complicated problems to deal with than exist in the Boundary District."

Referring to the imposition of a 20 per cent. ad valorem on zinc imported into the United States, Mr. Byron N. White, in an interview, stated that the effect of this imposition would be to close down the Slocan Star, which has been recently shipping six hundred tons of zinc concentrates to the smelter at Pueblo. Zinc miners in British Columbia have apprehended this danger for some time past, and all contracts have been made conditional on a freedom from duty. Mr. White thought that the action of the American authorities would furnish good ground for the imposition of a retaliatory Canadian duty on manufactured zinc. Such a course would hasten the building of a zinc smelter in British Columbia, which is bound to be established, in any event in the near future, but the immediate effect of excluding Canadian zinc from the United States is likely to be the closing-down of every zinc mine in the country.

Mr. W. W. B. McInnis, the new commissioner of the Yukon, in an address made before a Dawson audience shortly after his arrival, said, that coming from a mining Province he could well understand the difficulties under which the people of that territory laboured in respect to the mining regulations, but that he wished it to be understood that the policy he would follow would be, first, the protection of the prospector; that the people who had received concessions from the Government would be expected to carry out their part of the bargain with the Government, and that he proposed to discourage the practice of the acquisition of mineral lands for speculative purposes. Referring to the policy of the Government in respect to encouraging mining development, the speaker said:—"I heard long before I came into this-territory that the one great necessity here is to bring water on to the hill claims. I know, and the government at Ottawa realizes, that that is a problem that deserves their immediate consideration. You are well aware that at the present time they are collecting data in regard to this matter. Such an enterprise will involve an outlay of millions of dollars, and the Dominion government is fully alive to the mineral wealth of the Yukon, and so far as a water system will materially increase the min-

The Iron Age, referring to complaints with which the die trade is familiar anent—ill-fitting threaded joints and the careless manner in which these are made up—speaks of the paper recently contributed by Mr. F. N. Speller, of the National Tube Co., to the Proceedings of the Canadian Mining Institute, as being most opportune. Mr. Speller criticizes the general character of most of the tools for pipe fitting at present on the market, and the main essential principles which should be embodied in an easy cutting die are discussed. A die which tears or scrapes the metal out, owing to lack of clearance or insufficient rake on the cutting edge, cannot cut a true V-thread. The result is a short-lived die, a useless waste of labor, often permanent damage to the pipe, due to the twisting strain, and in the end a poor joint difficult to make tight even with recourse to the well known dopes and cements. A clean cut and accurate thread is naturally the easiest one to make, hence a properly made and well kept die is evidently by far the cheapest in the end. A consideration and appreciation of the principles which should govern die making would seem to be of great practical benefit to the pipe fitting trades. The tools in use should be easy to repair, and with a little practice it would not be much trouble for each shop, with the aid of an emery wheel, to keep its own tools up to the mark. The neglect of tools used on pipe fitting jobs is responsible for daily losses that would not be tolerated for a moment in a moderately well managed machine shop. There seems to be little excuse for this state of affairs, except that few pipe fitters have had the benefit of a machinist's training, and, therefore, have paid little attention to the mechanical principles involved in the tools they use.



## ONTARIO MINING INTELLIGENCE.

(From a Special Correspondent.)

The Ontario Government proposes to take strong measures to compel holders of mining concessions to live up to the terms of their leases. All leaseholders in arrears for a period of over one year, who have failed to perform the development work required by law on their properties, have been notified that it is the intention of the Government to cancel forthwith all leases where the terms have not been followed out. The Government also propose cancelling certain patents to mining lands, title in these cases, it is alleged, having been procured by fraud or misrepresentation. Writs have been issued by the Attorney-General against M. J. O'Brien, of Renfrew, W. C. Chambers, A. Ferland, Thos. Herbert, Nipissing; Ellis P. Carle, of New York and the Nipissing Mining Co., whose patents to territories in the township of Coleman, near the town site of Cobalt, in the silver district of that name, is likely to be forfeited. It is understood that this is the first of similar actions on the part of the Government.

Much interest has been created by a recent discovery of iron ore on the English River, north of Kenora, from the fact that though the find has been made in the district of Keewatin, it is in that part of the territory which will ere long be joined to the Province of Ontario. Report has it that there are deposits of lignite in this neighborhood, which may possibly be utilized.

Among the companies incorporated in Ontario during the past month are the Toronto Sand Lime Brick Co., of Sundridge; Concretes, Limited, of Toronto, to engage in all process of concrete manufacture; Ogden Oil Co., of Windsor, to bore for oil, gas and other mineral products; the Spider Lake Mining Co., of Windsor; the Loughborough Mining Co., of Sydenham. Extra-provincial companies authorized to do business in Ontario are the Ontario Gold Concessions, Limited; Anglo-Canadian Gold Estates, Limited; Drummond Mines, Limited—this company is operating a mine in the Cobalt area. The Dominion Natural Gas Co. has been authorized to increase its capital from \$500,000 to \$1,000,000.

A petition has been filed in the Court at Toronto, asking for the winding up of the North Shore Copper and Smelting Co., organized in 1903 to operate in the Sudbury district, where all its assets are situated. They consist of mining property, said to be worth very little and mortgaged to nearly their full value. The application is made on behalf of Pennsylvania shareholders.

The following mining leases have been cancelled by the Minister of Lands and Mines for Ontario:—Lease to Mr. James D. Taylor and transferred by him to the Great Lakes Copper Co., W.  $\frac{1}{2}$  and N.  $\frac{1}{2}$  of N. E.  $\frac{1}{4}$  of lot 11, 4th concession, township of Trill; lease to Ralph Gillespie and transferred by him to the Grand Lakes Copper Co., N. E.  $\frac{1}{4}$  of N.  $\frac{1}{2}$  of lot 10, 3rd concession of Trill; lease to Thos. Foster and Jas. D. Taylor, S. E.  $\frac{1}{4}$  of N.  $\frac{1}{2}$  of lot 10, 3rd concession of Trill.

The account of the silver mines at Cobalt, which recently appeared in the *Toronto Globe*, has created a great deal of interest, and an agitation has sprung up in favour of a system of royalties by which the public may share in the mineral wealth which is now believed may be recovered from the public lands in Northern Ontario. The *Globe* lays down three principles with which the mining regulations should comply (1) the title to mineral lands, like that of timber lands, should remain vested in the Crown for the advantage of the people; (2) no private party, whether individual or corporation, should be allowed to hold mineral lands on speculation, even on payment of a rental; (3) the revenue obtained by the province from ore deposits should be proportioned to the amount of ore extracted and disposed of.

A great deal can be said on both sides of this question of royalty. In two instances has it been imposed in Ontario and subsequently abandoned—in the case of the Madoc gold discoveries, and the nickel developments at Sudbury. It is understood that the Ontario Government will, at an early date, take the matter into consideration. The adoption of a royalty system would be popular, but whether it would tend to bring about the development of more mineral wealth in the best way is another matter. The question is of importance at present, not only on account of the Cobalt developments but because of the discovery of an important deposit of bessemer iron ore some distance east of Port Aetlin.

An important case came before the Hon. F. Cochrane, Minister of Lands and Mines for Ontario, recently, involving the ownership of 300 acres of nickel lands in the township of Morgan in the Sudbury district. The parties concerned are Mr. A. H. Smith and the Edison Mining Exploration Co. The latter had failed to pay the dues and Mr. Smith was informed that the lands were open and filed a claim and obtained a lease. Now, the Edison Company dispute his right. A point involved is the "discovery" of minerals on Crown lots. The Edison Co. also claim that if they made default they were entitled to notice before forfeiture. The whole question of blanket leases is involved. After hearing both sides Mr. Cochrane reserved his decision.

Mr. Wallace Maclean, who has just returned from an investigation of the Cobalt silver deposits, in an interview with your correspondent stated that there is much dissatisfaction among prospectors with some of the present mining regulations. A prospector who claims to have discovered mineral can plant a discovery post, make the necessary affidavit as to his discovery—and let the claim lie for a year without doing anything further. As a remedy, it is suggested that local inspectors should be appointed whose duty it would be to examine into the alleged discovery and ascertain if there is any mineral in situ. This need not cost the country anything, as the inspectors would be paid by those who requisitioned their services. Another complaint is that prospectors are not allowed on timber limits held under lease. Some of the valuable veins at Cobalt have been traced into the Lumsden and Booth and Gillies Bros.' limits. The lessees will not allow prospectors on their limits, but have prospectors of their own, so that if any mineral is found it will be claimed at once by the limit-holders when thrown open. This virtually gives a monopoly of these valuable mineral lands to the lumbermen. Asked his views on the question of royalty, Mr. Maclean said he thought there should be no royalty on mineral products up to a certain figure, say half a million or a million dollars. On all ore produced after that amount there could be no hardship in imposing a royalty, which should be on a sliding scale as with the succession duties. The prospectors are opposed to a royalty.

There are indications of renewed activity in the Parry Sound district. The Mountain Mining Company are working copper deposits, and there are rumors that a company with a capital of \$2,000,000 will erect a 50-ton smelter to treat the ores of the district. The Parry Sound Copper Company is to hold a meeting in a few days when it is expected a decision will be arrived at as to operating their claims. A miner who is familiar with the South African ores and who has been working in one of the mines, expresses his conviction that the Parry Sound ores are equal to the best in the world.

A new peat industry is about to commence operations in Ontario. It is known as the Manitoba Peat Company, and the scene of its operations will be at Fort Frances, where there are extensive bogs suitable for the manufacture of an excellent quality of fuel. The company installing three excavators and other machinery, which are to be run by electric power. The plant is expected to be ready to start this month. The shareholders are chiefly residents of Winnipeg, and it is expected a market will be found in that city, where the output can be sold for about \$6.50 a ton.

So many disputes with reference to mining claims have arisen in Northern Ontario, and the expense of bringing witnesses to Toronto is found to be so great, that the government has appointed Mr. S. Price, a barrister of St. Thomas, to investigate and adjudicate on these claims on the spot.

Toronto has been afforded the opportunity of securing an abundant supply of natural gas at a cheap rate. Mr. R. A. Broomfield, of Pittsburg, Penn., secretary of the Dominion Natural Gas Co., which controls most of the gas territory along the shore of Lake Erie, between Dunnville and Port Dover, covering an area of 40 miles by 16, has been in that city looking over the ground. His company is now supplying a number of western towns, and their pipes have been laid in Hamilton for the past four months, only awaiting a settlement of a disputed point with the city authorities to turn on the gas. The wells aggregate a large yield a day, and experts express the opinion that these, and other wells to be sunk, will yield an unfailing supply for many years to come. Mr. Broomfield thinks gas can be supplied in Toronto for 45 cents a thousand feet, perhaps less. The present price of gas is 80 cents. No overtures have yet been made to the City Council, but no difficulty is anticipated if the company shows that it means business.

Two mining locations on Lake Koo-ka-gaming, township of Scadding, district of Nipissing, W. D. 40, containing 76 acres, known as Eagle Nest Mining location, and W. D. 25, containing 177 acres, with Shaw Island 5 acres, adjoining the Eagle Nest location, were offered for sale by auction under a mortgage, at Toronto, recently, but as there was no bidding they were bought in for the mortgagees. These locations were originally purchased from the Crown Lands Department as gold prospects, but practically no development work has been attempted.

Great satisfaction is expressed at the announcement just made public that the famous Bruce Mines, on the North shore of the Georgian Bay, are to be re-opened. They have had a somewhat checkered career, having been worked at intervals ever since 1846, principally with English capital, and at one time, notwithstanding the somewhat crude methods employed, paid a dividend of 25 per cent. Later, a small force of men have kept the workings pumped out, and sufficient shipments from the old tailings have been made to pay running expenses. Now the mines have passed into the hands of the Lancaster Syndicate of London, England, which has organized the Copper Mine and Smelter Co., with a capital of \$100,000. A smelter is to be erected, and the output, which will commence with 100 tons a day,



will be increased before long to 400 tons. The re-opening of these mines is expected to give a great impetus to operations on the North shore.

Prof. W. G. Miller, provincial geologist, has just returned from a trip through a part of the mining territory of Eastern Ontario. He visited the following working properties, all of which lie near Madoc:—Eldorado Copper Mine, Queensboro Pyrites mine, Madoc talc mine, Madoc fluor spar mine. A carload of the material from the last mentioned deposit has recently been shipped. The mining of fluor spar is a new industry among the varied mining enterprises of Eastern Ontario. The Olden zinc deposit, near Parnham Station, was also visited. A concentrating plant has recently been erected and contains some new features, the sizing being done by a wet automatic stream and the concentrating on the New Bartlett simplex tables. It seems to be questionable whether success will be achieved in handling the ore on this property with these tables. The ores are much like those of Broken Hill, New South Wales. The Richardson feldspar mine, near Bedford Station, was visited. This deposit is worked on a large scale and is, in all probability, the largest deposit of its kind in the known world.

Mr. E. L. Fraleck, the engineer in charge of the Queensboro Pyrites mine, has recently submitted the following report of recent operations, together with a summary of the work accomplished at the property to date:—

"A working shaft 7x12 has been sunk to a depth of 75 ft.; at fifty feet in depth a drift has been driven to the north-east for a distance of thirty feet. The last twenty feet of the drift is now being blasted up to a depth of five feet to form a reservoir for the surface water which has been coming into the shaft. This makes a total of over a hundred feet of workings. The shaft has been securely timbered with a crib work round the top, a skidway secured by wall plates and a ladder and pipe way securely planked off from the shaft. A creek has been diverted and a stone earth filled retaining wall built. The crib-work round the shaft has been clayed and earth filled to prevent surface seepage. A substantial boiler house has been erected and a complete equipment for the development work installed. Nearly seven hundred tons of ore have been won from the dump out to the main road. Another building has been erected which comprises a room for an office and a living room for the Superintendent. The property is well stocked with lumber, timber, etc., for some time to come. The first shipments of the ore were made from the property this week, about forty-five tons being sent to Buffalo. Toward the close of the harvest season when teams are available six hundred tons will be shipped to Buffalo as quickly as possible; arrangements have been made with an acid works there for a profitable disposal. At the end of that time the work on the property will be in such a shape that shipments will be continuous. In about four months from date the property will be in a position to pay its own way and after that no further requisitions will be made on the head office for finances. The equipment of the mine is complete with the exception of a hoisting engine, heavier cable, larger sheave, etc., which should be installed before the winter season sets in. The permanent plant which will eventually be placed on the property will be paid for out of the profits of the mine and the winter season will be utilized getting out timber for same. Eventually a method of transportation will be developed from the mine direct to the railroad, thus saving about twenty-five cents per ton in putting our ore upon the cars. The expense of this, however, will also be met out of the mine. The high grade nature of the ore still continues at the bottom of the shaft, and no reason has yet been disclosed why the grade of our ore should not continue, or why our ore body should not be as large underground as the surface indications would lead us to expect. Including the contract work, we now have twelve men at the mine and this number will be increased from time to time as we extend our drifting and cross cutting work, which will enable us to proportionately increase the output of the mine."

#### MINING IN THE KOOTENAYS.

(From a Special Correspondent.)

Looking back over the month just past, although no one particular incident or occurrence stands out with unusual prominence, yet indications and evidences of progress have been general and the mining industry is certainly "picking up" marvellously. There is no doubt that the government bounty on lead is doing good, Mr. G. O. Buchanan, the government dispenser of this bounty, recently stating that he was now paying for the fiscal year just closed 156 bounty claims, made by as many different properties, this being an increase of 100 per cent. over the amount of lead yielding properties two years ago, that is, at the time of the inauguration of the bounty policy. Indeed, one of the best features in the matter is the number of small properties that are working all over the country, especially in the Lardeau and Ainsworth districts. And, as a consequence of this activity, induced by the better price of lead, the recent change

in the lead duties, the bounty, together with the increasing market in the Orient, naturally the exploration work has brought to light many discoveries which have been overlooked in this difficult country in the past. The country really has never been thoroughly prospected and will not be thoroughly prospected for many a year to come even were the present activity to keep up indefinitely. Notable among these new discoveries from the huge value of the assays, are the finds upon Poplar and Rapid creeks, the latter being about ten miles beyond Poplar up the Lardo River. Your correspondent has seen assays which run over \$200,000 in free gold, that is to say, over forty per cent. of the weight being gold. But this district as yet, despite the richness of the finds, has not come to the front. Its enemies say that it is merely a case of surface enrichment and that whatever values there are in the claims are in the first foot of depth. That is to say in the grass roots. Now, this is not absolutely true; still richness at depth has yet to be demonstrated. When this is shown Poplar will have a far different standing than it enjoys just now.

From what has been said, however, notwithstanding, there is no immediate prospect of any great increase in the output of lead outside of the Sullivan mine. But production from this property alone will effect a considerable increase. With its leadstacks both under operation, as should be the case within a month, the Sullivan smelter at Marysville, should make a contribution of at least 8,000 tons yearly to the lead output of the province. Directly opposite to the Sullivan is the North Star. This is situated on the same vein as is the Sullivan, which has a surface showing of about a quarter of a mile in width and traceable for several miles. The North Star was reported unfavourably upon a year ago, and although fair shipments were made during the past twelve months, principally, it is said, from the dumps and from a vein that was located on the property, yet shipments have again ceased. From the St. Eugene no great increase can be expected this year. Last year, the mine drove hard up to its fullest capacity to live up to its contracts, but this performance can hardly be expected to be maintained until such times as arrangements are made for shipping on a regularly larger scale. In the same section of the country is the Paradise and the Delphine, on Toby creek. From the Paradise something may be expected, but not until such time as the Kootenay Central Railroad is completed. Further up on Toby creek another strike of some importance has been made recently which is interesting mining men.

Coming west to Kootenay Lake there is great activity at the north end of the lake in the Ainsworth and Lardo-Duncan districts. Recently some American capitalists have gone in on the Duncan River, and it is expected that some good things may yet be got out of the Duncan country. Kaslo bestirred itself some time ago to build a wagon road into the district, but shortly after its completion came the slump in lead mining, now only just being recovered from, and nothing was done. The Highlander has not shipped for some time as it entered upon an extensive system of development work, which is now nearing completion, and from this an added supply of ore can be looked for.

In the Slocan camp there is a great deal of activity among the smaller properties, and, recently, a good strike has been reported from the Ottawa. Beyond this there is little increase to be expected. The Slocan Star has been tied up with litigation and the trial is still being proceeded with, a vexatious example of the lateral rights of the old system of mining claims. The Payne is shut down until such time as money is found to drive a new tunnel, which will cost a great deal of money, and the shareholders do not seem willing to produce the required amount at the present moment. The Monitor Ajax has been erecting a separator on Carpenter Creek, which is distant some ten miles or so from the property. Work is to be started upon this in the near future and demonstration will alone show whether the ore will bear the cost of transport so as to yield a profit. This is an English company.

In the Lardeau proper the Silver Cup is doing very well and the mill is being thoroughly overhauled and its rather ponderous machinery equipped so as to deal with the ore in more profitable shape. Experiment in these things is, after all, the only guide. But the Silver Cup, the Nettle L and the Triune are probably all three to be reckoned with in the estimate of the lead output for many a year to come. Sufficient work has been done to demonstrate the worth of the mine, and recent discoveries have put a yet stronger faith in the minds of the directorate.

Mr. Constant Fernau is trying a new scheme in zinc properties at the head of Kootenay Lake, where, by the way, the Krao, an old time standby, has again started up actively. He has acquired the Kootenay Chief, the United and the Blue Belle and proposes separating the zinc and then sending it over the Rocky Mountains to Frank to his zinc smelter there, which is now in course of erection and to which, it is stated, it is the intention eventually to add a lead stack. But whether this is likely to prove a success is yet to be demonstrated. The zinc smelter is the first in the country and as such should be welcomed inasmuch as it relieves the zinc mine owners from any fear of adverse action



on the part of the people of the United States, such as before destroyed temporarily the lead industry. Just now the proposition is to take the zinc ore from the mines mentioned at the head of Kootenay Lake and bring them to the foot of the lake, shipping them upon the C. P. R. at Kootenay landing, and then over the summit of the Rocky Mountains to trains to Frank. The attraction is the proximity of the Frank coal, which is said to possess good coking qualities. Whether it will prove cheaper to take the ore to Frank rather than a lesser amount of coke to Kootenay Lake, which would apparently seem to be the more reasonable course, remains yet to be seen. The great point is that a zinc smelter is really being added to the industries of the Kootenay, and it probably will not remain the only one of its kind.

In the Rossland copper gold camp there is nothing new. A proposed amalgamation between the White Bear and the California mine is talked of, the latter having been closed for several years and on the former a discovery of good smelting ore has been discovered on the 700 level. This is very much in nubibus at present. Development work is steady on the Le Roi and War Eagle mines, and an increasing output is the result of the better conditions recently prevailing in the camp.

The Boundary is steadily going ahead and its shipments are even beating the record of the previous year. The output for 1905 is likely to be very near if it does not exceed 1,000,000 tons. There has been some trouble over the Providence mine, chiefly because of an attempt of the Greenwood directors to wrest the control from the directors living in Chicago, which has resulted in the Chicago men winning and the local management being heavily censured by Mr. Justice Irving of the British Columbia Supreme Court.

Active construction seems likely to be started on the coast to Kootenay route, which will bring the many Similkameen properties into prominence. From all that is said of the Nickel Plate it is likely to prove one of the leading mines of the upper districts.

At the coast steady progress has been made, but with the exception of the unfortunate dispute over the Nanaimo coal mines, which now seems probable of adjustment, there is nothing particular to record.

### THE MONTH IN NOVA SCOTIA.

(From Our Special Correspondent.)

**Gold.**—It is understood that Mr. T. A. Rickard, of New York, the well-known mining engineer, and, until recently, editor of the Engineering and Mining Journal, is to be employed by the Provincial Government, and, in company with Mr. E. R. Faribault, of the Geological Survey Department, Ottawa, and Mr. D'Arcy Weatherbe, Engineer of the Provincial Mines Department, Halifax, will make a tour of inspection among the gold mines of the province. It is also understood that, in order to facilitate the matter, the Government is making arrangements for the unwatering of several of the representative mines.

During the month of July lease holders have been paying their annual rentals, which, according to the amendment to the Act, passed in 1902, must be paid by July 2nd of each year. This is, however, allowing thirty days' grace.

The gold mining areas applied for during July were mostly for areas previously held and which had been allowed to expire and were again retaken.

The areas applied for were as follows:—

|                                      |           |
|--------------------------------------|-----------|
| <b>Halifax Co.—</b>                  |           |
| Scraggy Lake District.....           | 21 areas. |
| Sheet Harbour ".....                 | 84 "      |
| Salmon River ".....                  | 60 "      |
| Montague ".....                      | 144 "     |
| Gay's River ".....                   | 3 "       |
| Tangier ".....                       | 223 "     |
| Lawrencetown ".....                  | 26 "      |
| Shier's Point ".....                 | 21 "      |
| Oldham ".....                        | 55 "      |
| Cow Bay ".....                       | 27 "      |
| Lochaber ".....                      | 12 "      |
| <b>Guysboro' Co.—</b>                |           |
| Miller's Lake District.....          | 41 areas. |
| Wine Harbour ".....                  | 6 "       |
| Ecum-Secum ".....                    | 10 "      |
| Stormont ".....                      | 290 "     |
| <b>Lunenburg Co.—</b>                |           |
| Centre District.....                 | 71 areas. |
| Gold River ".....                    | 25 "      |
| Leipsigate ".....                    | 31 "      |
| <b>Queens Co.—</b>                   |           |
| Whiteburn District.....              | 12 areas. |
| Brookfield ".....                    | 6 "       |
| Malaga ".....                        | 131 "     |
| Pleasant River Barrens District..... | 12 "      |
| <b>Hants Co.—</b>                    |           |
| East Rawdon District.....            | 30 areas. |
| West Gore ".....                     | 33 "      |
| Renfrew ".....                       | 57 "      |
| <b>Victoria Co.—</b>                 |           |
| Wagamatkook District.....            | 30 areas. |

The crushings are somewhat small owing to more attention having been lately given to development work.

Latest returns give the following crushings and yield:—

W. L. Libbey Mill, Brookfield District.—

3,290 tons crushed. Yield, 1,098 oz., 7 dwt., 14 grs.

Moose River Gold Mining Co. Caribou District.—

65 tons crushed. Yield, 20 oz., 13 dwt.

F. Taylor Mill. Oldham District.—

171 tons crushed. Yield, 193 oz., 11 dwt.

Walton Mill. Kemptville District.—

40 tons crushed. Yield, 17 oz., 13 dwt.

Old Provincial Mill. Wine Harbour District.—

1,316 tons crushed. Yield, 24 oz., 10 dwt.

Work at the iron mines at Torbrook is reported to be active. It is expected that five hundred additional men will shortly begin operations at Messrs. F. Wheelock's and M. P. Hoffman's works.

### OMITTED FOR THIS MONTH.

Owing to the pressure on our space this month, a number of articles, and some regular features have been left over. These include an interesting letter from Mr. T. H. Mason, of Halifax, criticising our remarks on the iron resources of Nova Scotia, our patent report, etc.

### GENERAL MINING NEWS—A MONTHLY SUMMARY.

#### NOVA SCOTIA.

The Nova Scotia Steel & Coal Co., New Glasgow, N.S., have their blast furnace and open hearth plant in full operation. The open hearth plant consists of a battery of three furnaces, each with a capacity of forty tons. Provisions have been made for the installation of two additional furnaces, the whole plant comprising, apart from the furnaces, a fifty-ton mixer, a ladle drying apparatus, gas producing battery, electric cranes and such accessories were erected by the company's own employees and is of the most modern type obtainable. The blast furnace has a capacity of 180 tons, but its entire product will now be utilized in the manufacture of steel. Its type is similar to that of the furnaces of the Dominion Steel Co. The coke plant comprises 150 ovens. This plant is conveniently located near the furnaces as well as are the electric power house and different shops.

The Dominion Iron & Steel Co., Sydney, N.S., have their rail mill put on double shift. The rod and blooming mills are also on double shift.

It having been announced that a new discovery of wolfram had been made at North-east Margaree, a correspondent of Greetings, a Cape Breton newspaper, writes: "This is no new find, as wolfram was discovered in this section in 1898. The mineral was found in a vein of quartz 2½ feet wide, and development operations were commenced, but were not continued for any length of time."

The Dominion Iron & Steel Company's rail mill, which has been employing only a single shift since operations were commenced some weeks ago, has during the month changed to two shifts, employing double the number of men, or 150 hands in all. In the company's open-hearth furnace building a new crane of large capacity has been installed. The company has at present in operation two blast furnaces both producing basic pig iron.

#### QUEBEC.

The Buckingham Post, in a recent issue, contains the following paragraph:—"As we understand it, the Anglo-Canadian Graphite Syndicate, Limited, has gone "bust" with the usual number of "suckers." Now, what is agitating the minds of those financially interested is: If the agreement of the company with the owners terminated on the 28th July midnight, does property, say cordwood, for instance, on which money is due, revert to the owners, and can it be legally transferred to the new lessors whom, we are told, are comprehended in the euphonious, high sounding and far-reaching title of Anglo-Canadian Merchants. It is understood that the new company intends paying its men weekly. This is good news."

#### ONTARIO.

It is reported that the Canadian Copper Co. have decided to establish a smelter for the treatment of the cobalt and other rich ores from the new Ontario district. The works will be at Copper Cliff and the plant will be installed in the course of the next few months. The company has a water power at High Falls, and is there establishing a plant for the transmission of power to Copper Cliff, a distance of twenty-five miles.

The optionees of the G. I. property in the Manitou district propose to commence active development work on the claim about the first of September. In this district it is also expected that the ten-stamp mill at the Big Master mine will resume crushing operations by the first of September next.

The Imperial Steel & Wire Co., Ltd., of Collingwood, Ont., proposes to increase the capacity of its plant this summer to fifty tons of wire per day.



Work on the buildings for the additional plant has been commenced. The building will consist of a fence mill, 60 x 200 feet, two storeys; galvanizing building, 40 x 250 feet, and warehouse, 100 x 200 feet. The additional machines to be installed will consist of a 250 horse-power water tube boiler and a compound condensing engine of 150 horse-power, to drive a 100 k.w. generator.

It is announced that the Imperial Oil Co., of Sarnia, is about to erect a coal-handling plant, to cost about \$40,000, and also has arranged to build a short line which will be equipped with two locomotives and sixteen cars, for handling the coal.

The Gladstone Development Co., of Ontario, was recently organized with a capital of \$75,000, to acquire and operate property in Gladstone Township, owned by a Mr. N. J. Morrissey. According to assay returns, the ore here contains good copper values. The claims cover an area of 400 acres, about seven miles from the C. P. R. tracks and north of Dean Lake.

The United Gas and Oil Company, of Windsor, who suspended operations in the Wheatley oil fields some time ago, but have lately commenced work again, have struck a large well about two and a half miles from here on the farm of Fred. Wright. It has flowed 150 barrels and is still flowing. This well has not been shot, and is thought by the company to be one of the best in this section.

In the Manitou district there appears to be some slight revival of interest, steps having been taken in the resumption of development operations at the Golden Rod Company's property, while good progress is being made in the development of the Minnehaha Gold M. & S. Co.'s property. Work is also under way at the Big Master Mines Company's property. The district has recently been visited by many mining men and prospective investors.

Important discoveries of iron ore have recently been made by prospectors in the vicinity of Iron Lake, east of Port Arthur. Messrs. Wiley Bros. report that the quality of this iron is good, being sufficiently low in sulphur and phosphorus to be suitable for the manufacture of Bessemer steel. At the instance of Prof. Miller, the Provincial Geologist, a party has been inspecting the ground for the past month, and now reports that the field is much more extensive than was originally believed. Little can be said, however, of the quality or actual value of the new discovery until development operations are commenced.

The Ontario Government, it is understood, has engaged the services of an eminent mineralogist from Saxony, reputed to be the highest authority in the world upon Cobalt ores, to investigate and report upon the rich Cobalt areas of Nipissing near New Liskeard.

A dispatch from Port Arthur, Ont., states that Messrs. Mackenzie & Mann and Marks & Wiley have concluded arrangements by which all their iron mining properties on Atikokan Steep and Rocking will be transferred to the Port Arthur Iron Mines Co., Ltd., which is being incorporated with a capital of \$500,000. Active mining operations are to commence immediately, arrangements having been made by which 50,000 tons of sulphur ore are to be shipped annually to the States. The deal will embrace between 20,000 and 25,000 acres of land, taking in the whole Atikokan range outside of claims held by McKellar, Pumpelly, Smith and Coleray. The arrangement assures active development work upon the property, but it is improbable any ore can be shipped before the end of the year.

#### ALBERTA.

The oil from the wells, which have not yet been productively developed owing to litigation between the Canadian Pacific Railway and the Canadian Government, which only ended last month, is alleged, as it comes from the wells, to be sixty-five per cent. pure and of the non-sulphurous kind, which gives off no smoke.

The Big Seepage springs, where the work is most developed, lie fifty-five miles north of Belton, Mont., ten miles across the boundary line. The country is rough and uncultivated, and is only reached from Belton by stage or horse back.

The extraordinary purity of the oil found in the Big Seepage Springs, in Alberta, has been much commented on, although the circumstance itself is unfavourable, having regard to the permanence of the occurrence.

#### BRITISH COLUMBIA.

**The Coast.**—The Western Construction Company of San Francisco has undertaken to supply the United States Government with several million yards of cut and dressed stone from the Newcastle Island quarries, near Nanaimo. It is estimated that it will require three years before the contract is filled.

Crushing operations have commenced at the Britannia mine, Howe's Sound, and shipments are shortly to be commenced to the Crofton smelter.

Mr. H. Wild, M. E., of New York, has secured an option on the Van Anda Mines, Texada Island. These properties were owned formerly by an American company, who, as a result of bad and extravagant management, came to grief. The mines have been bonded twice in the last few years.

**Boundary District.**—The owners of the Sally Mine on the West Fork of Kettle River last month received a cheque for \$4,142.50 from the Trail Smelter, in payment for twenty tons of ore shipped recently from this property. The group is situated at Wallace Mountain, near the junction of Beaver Creek with the West Fork of Kettle River. There are a number of promising prospects in this vicinity, and it is expected that many of these mines will be able to begin production when the Midway & Vernon Ry. (which is about to be constructed) affords the necessary transportation facilities. The ore in this camp gives very high silver values, shipments from the Sally having averaged over 225 oz. to the ton.

**Slocan.**—The installation of a compressor plant and mill is to be made shortly at the Argenta mine. It is also proposed to build a tramway 2½ miles in length from the mine to the waggon-road.

Milling operations are in steady progress at the Jackson mine, where four hundred tons of zinc concentrates were produced last month and are ready to be shipped to the Kaslo sampler. At the Ruth mine, mill operations are to be resumed directly the contemplated additions shall have been made to the Kaslo works, as at present the sampler is not in condition to receive ore. The company has ordered three new zinc machines from the United States, which are expected to arrive in the course of the next two weeks.

**Nelson.**—The Nelson press makes rather much of the fact that a sample of ore brought from the Molly Gibson mine was found to assay 2931.8 oz. in silver. Of course, the assay returns from a mere specimen may have no special significance. It is not unlikely, however, that the Molly Gibson will prove to be a very rich property, from which handsome profits will be realized under good and careful management. Ore is now being taken out, ready for shipment, there being employed at the mine a force of twenty-five men.

The British Columbia M. & D. Co., of Rossland and Chicago, have instructed their manager to proceed at once with development work upon the Bon Ton group of claims on White Grouse Mountain, east of Kootenay Lake. There is said to be an excellent showing on the property, which has been opened by surface cuts.

**Rossland.**—The Privy Council has allowed the Centre Star Mining Company the right to a cross appeal in its suit against the Rossland Kootenay Mining Company. The action was brought against the Rossland Kootenay Mining Company by the Centre Star Mining Company, which claimed (1) Damages for the original trespass committed by the Rossland Great Western Mines, Ltd., the predecessors in title to the defendants; (2) Damages for a large quantity of ore taken by the Rossland Great Western Mines, Ltd., from the Centre Star property; (3) Damages sustained by the Centre Star Mining Company owing to water which was allowed to escape from the Nickel Plate mine along the trespass workings into the Centre Star mine; (4) An injunction against the Rossland Kootenay Mining Company to prevent a repetition of the aforesaid damages.

The Canadian Gold Fields Syndicate of Rossland, has distributed a quarterly dividend of 2 per cent. The syndicate has paid in dividends in all \$72,000, of which \$36,000 has been paid since the 15th of December last.

At the Centre Star mine preparations are being made to extend the shaft down from the 9th level, and work was to have been commenced at the beginning of August. An electric locomotive is to be installed at the mine to transport the ore from the shaft to the bunkers. Stopping meanwhile continues on the 3rd, 4th, 5th, 7th, and 8th levels, where development work is also in progress.

The Rossland Miner states that the new shaft on the 6th level of the War Eagle is opening up in a very satisfactory manner, and the ore that is being stoped from it is of excellent grade.

Both the concentrators at the Le Roi and the Le Roi No. 2 are now running steadily on second class ore. The Le Roi concentrator is said to be giving good results, although this method is still regarded as experimentally treatment only.

At the Trail smelter the lead stack was blown in during July, while the work of enlarging the refinery is making good headway.

There is still some prospect of an amalgamation between the White Bear and California Companies, though the Rossland Miner points out that the owners of the California appear to have an exaggerated idea of the value of their property, which is practically undeveloped. The White Bear, on the other hand, has a good showing of ore, and some of it is of an exceptionally high grade. Besides this it has a valuable concentrating mill, a good plant for hoisting and a compressor plant. It would seem as though the advantages, so far, as having the more valuable property and plant are concerned, are on the side of the White Bear.

**East Kootenay.**—Mr. S. S. Fowler, who recently visited the Paradise mine in the Windermere section, reports that a discovery of high grade silver has been made on the north fork of Toby Creek. This strike is said to be one of the largest and most important yet made in Northeast Kootenay.



A new 30-drill air compressor has been installed at the St. Eugene. This plant has a capacity of 3,000 feet of air per minute and will enable the mine to operate in all fifty drills.

**Atlin.**—Recent work on the Columbia Hydraulic Company's property on Spruce Creek is said to have demonstrated the existence of a large quantity of pay gravel, and it is anticipated that the clean-up for the season will be a satisfactory one. Good reports continue to be received concerning dredging operations on Gold Run. A steam drill is being employed loosening the ground ahead of the dredge, and a large area of good ground has been opened up.

**Ainsworth.**—Mr. Fernau has commenced active operations at the United mine, and has arranged to secure air for power purposes from the Taylor compressor plant, for this property and also for the Glenlarry.

Mr. D. F. Strobeck has taken over the direction of the Pacific-Bullion Co.'s claims, upon which work is also about to recommence. This company many years ago, made some heavy shipments of ore, but the work was afterwards suspended in consequence of adverse conditions. Other important intelligence from this district is to the effect that rich strikes have been made on the Highland property recently, a large vein of concentrating ore having been opened up on the surface.

**Similkameen.**—Operations at the Nickle Plate mine are now being carried on upon an extensive scale, about 3,000 tons of ore being mined and crushed per month. A force of one hundred men is employed at the mine and mill.

**Lardeau.**—A new company called the Camborne Mining Company, was formed at Calumet, Mich., on July 21 to take over the assets and property of the Northwestern Development Syndicate, Ltd., and the Gold Finch Mining Company, Ltd. The property includes a 10-stamp mill and other machinery, a gravity tram about a mile in length; electric power house generating sufficient power to operate the mill and drills, and also the illumination of the mine and buildings. The Goldfinch claim has produced \$12,000 in bullion to date.

The Swede and Lucky Jack properties at Poplar Creek have been acquired by a new concern called The International Mining Company, which proposes to continue the development of the mines and install a mill and tramway on the Swede.

**Atlin.**—Atlin reports state that the water is falling rapidly in McKee Creek, and will, it is feared, considerably restrict operations for the rest of the season; meanwhile, the McKee Creek Hydraulic Co.'s clean-up last month realized approximately, \$10,000.

The Northern Mines, Ltd., has been engaged in installing a steam shovel and auxiliary plant on Spruce Creek, and it is expected that digging will be in operation early in August.

**Cassiar.**—News of the discovery of rich gold quartz was recently reported by Mr. C. W. D. Clifford, M.P.P., to have been made on the Copper River, some 50 miles above Hazelton, on the Skeena.

**Ainsworth.**—Mr. C. Fernau, of the Canadian Metals Co., has secured control of the United Mine in this district. Negotiations are also in progress for the purchase of the Kootenay Chief, which contains a large body of low-grade zinc-lead ore.

**The Coast.**—The iron deposits on the West coast of Vancouver Island continue to attract attention. On Quatsino Sound several properties have recently been bonded and it is stated that a dozen or more ovens will be built at once for the making of charcoal iron.

**Boundary District.**—The production of the Boundary District for the seven months ending July 31st, approximated 540,000 tons. Of this total the Granby has contributed about 345,000 tons, the next largest producer being the British Columbia Copper Company with 95,000 tons.

A struggle for control of the Providence mine between factions representing Chicago and local interests culminated last month in a victory for the former, when in four actions heard in Nelson a Supreme Court judge gave his decision favouring the contentions of the Chicago directors. The evidence showed that some of the tactics of the contending parties had been most discreditable.

The Phoenix Pioneer states that there is some talk of reviving the project of driving a 4,000 foot tunnel into Hardy Mountain, near Grand Forks, thereby tapping a number of leads at a depth of some 1,800 feet. It is claimed that the undertaking can be carried into effect at a cost of \$75,000.

A consolidation has been arranged between the Freemont, Strathmore and Barbara high grade properties near Greenwood. The Strathmore and Barbara, it is stated, are in a position to commence shipments of ore running about \$100 to the ton. The Freemont is situated between the Providence and Strathmore, and has an excellent showing of ore. The syndicate owning these properties include a number of well known residents of Chicago, including the mayor, Mr. Dunne; Hon. George E. Foss, chairman of the naval committee in Congress; Mr. W. F. Porter, of Marshall Field & Co.; Judge Prendeville, ex-Senator Hall, Mr. John G. McPherson, Mr. Charles Winslow, a member of the Board of Trade, and Mr. A. B. Shaw, director of the Drovers' Bank. The syndicate have agreed to set aside \$25,000 for the development of the Strathmore and Freemont.

**Cariboo.**—Mr. John Hopp, of the Slough Creek, Ltd., is authority for the statement that the Cariboo output for 1905 will nearly equal last year's production. This was contrary to expectations, as the spring was very early, the snowfall light, and consequently the prospects of an adequate water supply were unfavourable. The outlook at the Slough Creek property is extremely encouraging.

The Ashcroft Journal states that satisfactory clean-ups are being made by the hydraulic and drifting mines on Kootenay Creek. The Onward drifting claim has paid another dividend, the third during the present year, while Messrs. Veith and Borland are reaping the reward of their persistence in the operation of their claim. Ever since the lead was struck it has been a steady producing and profit-earning property.

**Slocan.**—A vein of very hard quartz was recently encountered in the Last Chance mine. This quartz is of unusual character in this district, and contains much gray copper and ruby silver, assays having been obtained giving 600 to 1,100 ozs. of silver to the ton. The occurrence of dry ore here is most unusual. A fine body of rich ore is being worked at the Mountain Con, this having been encountered recently in a new upraise. It is expected that a pack train will be busily employed for the rest of the year hauling out ore from this property.

It is reported that the Hewitt mine, near Silverton, has been sold to Chicago investors.

The case of the Slocan Star Mining Co. vs. B. N. White Co., involving the question of extralateral rights, was tried in Nelson during the last week of July. After hearing argument of counsel, the Chief Justice declared that the plaintiffs' contention was mythical. Notice of appeal to full court was given.

The Molly Hughes group near New Denver, one of the earliest locations in the Slocan district, has been bonded to German investors. Operations are to be resumed at the property immediately.

**Nelson.**—The Kootenay Bell, a free-milling property, near Salmo, has been leased by Mr. G. D. Bell, and operations have been resumed with a force of 20 men.

In the No. 5, the lowest tunnel at the Molly Gibson, 1,000 feet in and at a depth of about 500 feet, a ledge of high grade silver ore has been encountered. Values chiefly occur in the form of ruby and native silver, while there is also present gray copper.

## YUKON.

There seems to be no doubt that the discovery of new gold diggings at Willow Creek, in the Nisultin District, is genuine, and that another important placer mining district will be added to the productive area of the Yukon. The depth of bed-rock is eight feet, or less in many places. The pay averages from three cents to seven cents per pan, and is uniform on all the creeks so far prospected. It is, however, reported that boulders are both plentiful and large, which will, of course, render the ground difficult to work by pick and shovel. Willow Creek lies about one hundred miles due east of White Horse.

On Hiatt Creek some eighty miners are now working. The pay is said to average from six cents to nine and one-half cents to the pan.

An important new strike of rich placer ground is reported to have been made on Indian River.

There are said to be many excellent promising indications of mineral oil throughout the Yukon, the Indians having for years past used seepage oil as a coating for canoes. Meanwhile, a number of claims have been located, and applications made for record to the Dominion Government. It is said that these properties are quite accessible, and not far from White Horse.

A large dredge is being erected at the mouth of Bear Creek, the last of the machinery having been received during the month. This consisted of a large cylinder screen, the Grizzly being some twenty-five feet long and weighing 27,250 lbs. A team of fourteen horses was required to haul this piece of machinery to its destination.

As there are several Willow Creeks in the Yukon territory, the name of the creek in the Teslin district, on which the recent gold discoveries were made, has been changed at the suggestion of the recording officer to Iron Creek. Gold has been found on other creeks in the same locality, one of the most promising streams being Sydney Creek, where prospects amounting to 25 cents to the pound have been obtained.

## COAL MINING NOTES.

### NOVA SCOTIA.

Tests of a new hydraulic mining machine are being made in one of the collieries of the Dominion Coal Co. The machine contains a row of telescopic pistons at one end and a small pump at the other. After the coal is undercut the machine is operated parallel with and near the roof. The action of the pump forces water along a tube, where it comes in contact with the pistons. There it penetrates the coal seam in a downward direction, and as pressure increases the coal begins to fall to the floor. The use of the



machine does away with explosives, and in addition to being economical in operation, is said to produce the coal with the least possible breakage.

The Dominion Coal Co.'s production for the month of July aggregated 329,164 tons, an increase of 69,809 tons over the corresponding period last year. The shipments were 343,198 tons.

Output was divided among the respective collieries as follows:—

|          |            |        |
|----------|------------|--------|
| Dominion | No. 1..... | 49,563 |
| "        | No. 2..... | 45,545 |
| "        | No. 3..... | 37,357 |
| "        | No. 4..... | 50,668 |
| "        | No. 5..... | 69,501 |
| "        | No. 6..... | 6,193  |
| "        | No. 7..... | 16,193 |
| "        | No. 8..... | 20,985 |
| "        | No. 9..... | 32,730 |

The output (in tons) by months since the beginning of the year compares with previous years as follows:—

|                | 1905.   | 1904.   | 1903.   | 1902.   |
|----------------|---------|---------|---------|---------|
| January .....  | 160,618 | 101,721 | 270,120 | 205,000 |
| February ..... | 128,778 | 183,500 | 258,798 | 197,943 |
| March .....    | 228,765 | 236,290 | 289,660 | 236,290 |
| April .....    | 221,541 | 242,625 | 263,878 | 242,252 |
| May .....      | 294,647 | 310,555 | 251,813 | 259,994 |
| June .....     | 332,926 | 331,090 | 283,000 | 276,000 |
| July .....     | 329,164 | 259,355 | 275,850 | 307,298 |

Totals .....1,696,439 1,765,136 1,893,119 1,751,849

A dispatch from Glace Bay states that one of the biggest strikes in the history of the coal mining industry in Cape Breton was made in July, near Gardiner Mines, when the famous Mullins Seam, which for over fifty years has defied all efforts to trace out its course for any distance, or for any degree of accuracy. The existence of the seam, has, of course, been known for scores of years back. At Low Point the seam crops out on the sea shore, and coal has for a long time been taken from it for domestic use. It has always been held in high repute for household purposes. Some progress was made previous to this season in tracing out the seam. Mr. P. Neville, Deputy Inspector of Mines, in 1904, traced the seam from Low Point to the head of Lingan Bay, and about a mile and a quarter west of the Sydney and Louisburg Railway and back of Gardiner mines. Early in July men were employed boring at the upper southwest side of Lynks Lake, at a depth of only about seventy feet. The seam at that point is as follows:—Drift, five feet, nineteen feet of strata and shale, one foot six inches of clear coal, forty-eight feet of sand, stone and shale, five feet six inches of good, clear coal. It is now established that the Tracey and the Mullins are two distinct seams as the Mullins turns eastward into the Glace Bay basin. The latter seam is seven feet thick at Low Point. The seam underlies the Phalen, Hub and all seams operated by the Dominion Coal Company. Its course and the area of the country under which it lies are now indicated at least in a general manner by the discovery. Its extent is said to be greater than any seam yet discovered and it is impossible to compute the quantity of coal in the seam. It underlies some of the Dominion Coal Company's areas, the areas owned by the Weatherbe Atlantic Coal Co., at Bridgeport. Boring operations will be continued at other points by the Dominion Coal Company, and development work will, it is expected, commence this autumn. The length in a straight line of country covered by the Mullins seam is about 16 miles. Its outcrop line is about 25 miles. The land area covered would be more than 150 square miles.

A rich coal strike was made recently near Lingan, N.S., which shows six feet of clean coal land, area of about 100 square miles or 619,520,000 tons of coal.

In the last six months the Nova Scotia Steel & Coal Co., New Glasgow, N.S., have shipped 206,376 tons of coal, against 196,652 tons last year for the same period, an increase of 9,723 tons.

The Dominion Coal Company has purchased 150 new steel cars, each having a capacity of about 100,000 lbs.

A new trial pit is to be put down at the new Dominion No. 4 colliery. It is expected that this pit will be sunk on the Whalen property at Little Bras d'Or, and the company's railway will be extended from Dominion No. 3 colliery to the new mine.

#### BRITISH COLUMBIA.

**Alberta.**—In spite of the fact that the Granby Company has discontinued purchasing its coke from the International Coal & Coke Co., work at its collieries is being continued as usual, a daily output of some 700 tons being maintained, of which but 50 tons are used for the manufacture of coke. It is proposed to complete the building of the first battery of coke ovens, which will give 104 ovens in all.

The appeal, in the case of the Attorney General of British Columbia vs. The Wellington Colliery Company, was heard by the Privy Council last month. This involved the legality of the Wellington Colliery Company in employing Chinese underground in the mines in contravention of the provincial act. The company assumed the position that the provincial government had no jurisdiction to prevent the

company from ordering its servants to any part of its own property. The Privy Council upheld the decision of the lower court by dismissing the appeal of the Attorney General.

The coal and coke output of the Crow's Nest Pass Coal Co. for the six months ending June 30th, are as follows:—

| Coal.             | Tons.      |
|-------------------|------------|
| Coal Creek, ..... | 207,764.03 |
| Michel .....      | 162,523.12 |
| Carbonado .....   | 47,080.99  |

Total ..... 417,368.04

| Coal Manufactured Into Coke. | Tons.     |
|------------------------------|-----------|
| Coal Creek .....             | 97,853.07 |
| Michel .....                 | 95,072.02 |
| Carbonado .....              | 8,473.13  |

Total ..... 201,399.02

**Nelson.**—The Hunter V. mine at Ymir has been leased to the Hall Mining & Smelting Co., and operations have been resumed at the mine.

Mr. A. W. McVittie, P. L. S., of Cranbrook, has located five square miles of coal lands near Okanagan Lake, where there are said to be several promising seams of bituminous coal outcropping on the side of the mountain north of the valley on Short's Creek. The openings made for examination are 1,700 feet above the creek and 2,800 feet above Okanagan Lake.

**Lardeau.**—Development work is in active progress at the Silver Cup mine, where a level about three hundred feet below the previous workings of the property is now being run and connections made by means of an upraise. Some weeks ago a large body of concentrating ore was encountered, and recently a crosscut from this body opened by a lead of between one and two feet in width, and giving values of between 200 and 300 oz. in silver.

Arrangements have been made for the operation of the McMinnville group of claims on Lexington Mountain, the owners having in contemplation the installation of a stamp mill on the property. The ore is said to average about \$8.50 in gold per ton.

**Rossland.**—A promising strike is reported to have been made on the Lord group of claims at Sheep Lake, the lead seven feet wide having been opened up at a depth of 30 feet, the ore carrying fair gold and high silver values.

It is reported that negotiations are now in progress for the consolidation of the White Bear, California, Giant, Cariboo, and possibly one or two other properties in the same neighborhood.

The White Bear mine, which has been closed down for the last two months resumed operations on August 1st. The White Bear is said to have an excellent shoot of ore of smelting grade.

#### COMPANY MEETINGS.

**Tyee Copper Company.**—The sixth ordinary general meeting of the shareholders of this company was held in London on July 18th last, the chairman, in referring to the report of the auditor, said:—

"The first two items in the revenue account refer to dividends paid, the one of 5 per cent. being on account of the year ended April, 1904, and the other the interim dividend paid in December, 1904. The amount of £11,062 has been placed to reserve, as agreed in 1903. £6,700 is placed on deposit at our bankers, and may be used for the requirements of the mine, but not for dividends. The amount written off plant, mine, and smelter is £9,937. This is the amount spent upon new buildings, machinery, etc.; but as we have no spare capital your directors felt that the best way to deal with it was to write it off. On the credit side there is one item of £836—interest received from the reserve fund investments, and is credited to that fund. Sundry creditors have been all paid, with the exception of income-tax. Although much development work has been done, success has not up to the present time crowned our efforts; but it is fully believed by those capable of judging that in a short time our hopes will be realised. Your board feels that the shareholders will be greatly disappointed at their decision not to recommend the payment of further dividends until a fresh ore body is cut and proved—but they hope that they will soon be able to resume and pay periodically that which we all desire.

A shareholder asked why, with £32,000 on deposit on view of the statement that 2,000 tons would pay all expenses and give them ten per cent. on the nominal capital, the directors wished to hold back the money in hand?

Another shareholder remarked that at present the company had about £73,000, and he thought the shareholders ought to have a little bit of that to go on with.

Mr. Ludwig Loeffler said some gentlemen appeared to take a very sanguine view of the future of the property, and he hoped their anticipations might be correct, for the sake of all the shareholders. He, however, was not sanguine, and he would give his reason for saying so. Quite in the early history of the company, in 1901, a note of warning was sounded as to the character of the mine depth by Mr.



Thompson, the well-known mining expert, who then acted as consulting engineer to the company, and had examined the mine on different occasions. He did not feel satisfied with the appearance of the ground at the 200 feet level when reached, and recommended to the board the sinking of a shaft to a greater depth to ascertain the character of the formation below the surface ore body. Some time after the most sanguine hopes of finding ore bodies were entertained by the management in respect of the 400 feet level; but, notwithstanding extensive exploration, they proved a disappointment. The same occurred at the 600 feet level, and, unfortunately, they had experienced the same disappointment at the 800 feet level—the lowest point they were able to reach with their present hoist and power. Under these circumstances they ought not to act on hopes and expectations of so uncertain a nature, but only on existing facts and data. Such were contained in the report of their mining engineer, Mr. Musgrave. As far as it was possible to arrive at figures from his statements, he (the speaker) concluded that their present ore reserves, at the reduced output of 2000 tons per month at which they were now working, might only last for another year or eighteen months. If by that time they had not found new ore bodies, either in depth or in any of their other claims, their position would be a very serious one. Their other claims had yet to be proved. The most promising amongst them, the X L., had been seriously taken in hand during the year with which they were dealing. Considerable work had been done by way of sinking and cross-cutting; but, to their great disappointment, the result had been practically nil, and no ore body had been found. The business of their smelter for custom ores was at present too small to be taken into consideration. They, therefore, had to face the situation that at a very near period they might find themselves without ore, and that they would require all the cash reserves which they had accumulated. They would soon have to meet heavy expenditure to increase their plant and provide for sinking and other exploration work, and if all their endeavours to find ore should prove unsuccessful, as was quite possible, they might have to consider what other arrangements could be made under the circumstances in which they might then be placed. Should they be lucky enough to meet with large ore bodies, such a fortunate incident would, of course, at once change their position for the better, and would enable them to appropriate such part of their savings for dividends as the improved circumstances might reasonably warrant. On May 9th, 1902, the colonial holding amounted to 19,013 shares; on April 20th, 1904, the total colonial holding was 12,233 shares; and on June 26th, 1905, when the saving in and the reduction in the output took place, it was reduced to only 2,926.

The Chairman stated, that the directors considered it a wise policy to write down the buildings and machinery, and so place the balance-sheet on a sound basis. He did not think the shareholders need despair about the property.

#### COMPANY NOTES.

**Princess Royal Gold Mining Co., Ltd.**—This company has been registered at Somerset House, London, with a capital of £500,000 in £1 shares. Objects: To acquire from the Princess Royal Gold Mines, Limited, certain mineral areas, to adopt an agreement with the said company and the Hon. W. Pugsley, and to carry on, in British Columbia or elsewhere, the business of miners, prospectors, metallurgists, refiners and dressers of and dealers in ores and minerals, etc. Mr. Tweedie, the Premier of New Brunswick; Mr. Pugsley, the Attorney General, and several other prominent residents of New Brunswick, are, it is understood, largely interested in this property, while a son of Mr. Tweedie is acting as mine manager.

**Montreal & Boston**—Shareholders of the Montreal & Boston Company, according to the Wall Street Journal, subscribed to less than one-quarter of the \$700,000 bonds of the Dominion Copper Co., the reorganized company, which were offered to stockholders at 90 with a 200 per cent. stock bonus. This was probably as the underwriters desired, for no facilities were given stockholders to subscribe for the new bonds, nor were they given a very long time in which to subscribe. Underwriters secure the bonds at 80. Mr. S. Newhouse is now in charge of the properties, and his representatives are now in the Boundary preparing to resume operations. The smelter will be doubled, a converter plant installed, and the mines will be opened to permit of a much larger production.

Notice is given by the Montreal & Boston Consolidated Mining & Smelting Co., Limited, that the sale of the company's property to the Dominion Copper Co., Limited, under the agreement of May 11 has been completed, and that the stock of the latter company is now ready to be exchanged, share for share, for the stock of the Montreal & Boston. Stockholders are requested, in view of probable early proceedings for the dissolution of the Montreal & Boston Co. to exchange their stock as soon as possible. Holders of certificates not standing in their own names should send their certificates to the Securities Transfer & Registrar Co., the transfer agent of the company, for transfer to their own name.

**Ymir (Nelson)**—Return for June: 30 stamps ran 27 days and crushed 2,000 tons (2,000 lbs.) of ore, producing 363 oz. bullion. The estimated realisable value (gross) of the product is \$3,390; 205 tons of concentrates shipped; gross estimated value, \$4,400; cyanide plant treated, 1,700 tons (2,000 lbs.) of tailings, producing bullion having estimated gross value of \$1,000; sundry revenue, \$80; equal to \$8,870; working expenses, \$8,714; profit, \$156. There was expended during the month on development \$2,870.

**Tyee Copper (Vancouver Island.)**—Cablegram received recently, giving results for the month of June as follows:—"Smelter ran thirteen days and smelted: Tyee ore, 1,988 tons; customs ore, 294 tons; total, 2,282 tons. Matte produced from same, 267 tons; gross value of contents (copper, silver and gold), after deducting costs of refining and purchase of customs ore, \$30,950." N.B.—Part of June product was treated in the first few days of July, in order to suit the visit of the American Institute of Mining Engineers on the 4th instant.

**Cariboo Consolidated.**—The latest news from British Columbia is contained in the following cablegram from the resident manager just to hand:—"During the month of June washed 565 cubic yards of gravel, yielding 1,130 dollars. Impossible to deal with cost of extraction by cable. I will write you fully by next mail." Office Note.—This gravel has only been obtained from development drives in order to enter the channel proper, and is not from the centre pay lead, but regular drifting will shortly be commenced.

**Le Roi Mine.**—The following cablegram has been received from Rossland:—"Shipped from the mine to Northport during the past month, 8,788 tons of ore, containing 3,430 ozs. of gold, 3,200 ozs. of silver, 163,600 lbs. copper. Estimated profit on this ore, after deducting cost of mining, smelting, realisation, depreciation, \$13,500. Expenditure on development work during the month, \$10,000. Experimental concentration mill commenced running on July 1st. Nothing new to report in the mine of importance."

#### MINING AND INDUSTRIAL SHARE MARKET.

(Specially reported by Messrs. Robert Meredith & Co., Montreal.)

Public attention is turning again to mining stocks, and though as yet to a limited extent, there is more enquiry than has been noticed for a considerable time past. This is due partly to the pending consolidation of the larger mines in British Columbia, and to favourable reports of the week going on in various properties. Indications are that speculation in mines will become a feature before long, but on a more substantial basis than in past years. The industrials are without special feature, prices hold firm but the transactions are small, and in some, quotations are nominal, a fair sized trade being apt to make a fluctuation of several points either way.

Quotations at Aug. 15th were as follows:—

| Par value of shares.                          | Asked. | Bid.  |
|-----------------------------------------------|--------|-------|
| .10 Canadian Gold Fields Syndicate..          | .05    | .04½  |
| 1.00 Centre Star .....                        | .35    | .33   |
| 1.00 Deer Trail Consolidated .....            | .01½   | .00   |
| 1.00 Giant .....                              | .03½   | .00   |
| 10.00 Granby Consolidated .....               | 7.50   | 7.25  |
| 10.00 Montreal and Boston .....               | .02    | —     |
| 1.00 North Star .....                         | .02    | .01   |
| 1.00 Payne .....                              | .20    | .15   |
| 1.00 Rambler Cariboo .....                    | .00    | .00   |
| 1.00 Republic .....                           | .50    | .47   |
| 1.00 St. Eugene .....                         | .19    | .17   |
| 1.00 War Eagle .....                          | .04    | .02   |
| 1.00 White Bear .....                         | 65.50  | 63.75 |
| 100.00 Nova Scotia Steel (common) .....       | —      | —     |
| 100.00 Ditto ditto (preferred) .....          | 79.00  | 78.00 |
| 100.00 Dominion Coal (common) .....           | —      | —     |
| 100.00 Ditto ditto (preferred) .....          | 22.50  | 22.75 |
| 100.00 Dominion Iron and Steel (common) ..... | 73.00  | 72.00 |
| 100.00 Ditto ditto ditto (pref'd.) .....      | 85.00  | 83.50 |
| — Ditto ditto ditto(bonds) ..                 | —      | —     |

#### INDUSTRIAL NOTES.

The Robb Engineering Company is building two 200-horse power Robb-Mumford boilers for the Cumberland Railway & Coal Company, Springhill, while the Dominion Iron & Steel Company have also recently ordered a 150-h.p. boiler of this type.

The Wellman-Seaver-Morgan Company, Cleveland, Ohio, have established a branch office at No. 216 Dooly Block, Salt Lake City, Mr. Harry V. Croll, M.E., having been appointed manager thereof. Inquiries addressed to the Salt Lake City office will have Mr. Croll's personal attention.

The Canadian Pacific Railway Co. has purchased four large steam shovels from the Locomotive & Machine Company of Montreal. This order is the first of its kind to be placed in Canada, all steam shovels having been purchased heretofore in the United States.



A special despatch from Nelson states: "The contract for the hydraulic and electrical machinery for the City of Nelson power plant on the Kootenay River has been awarded to Allis-Chalmers-Bullock, Limited, Montreal. The tenders were: Canadian General Electric Co., \$32,000 for the electrical machinery; the Canadian Westinghouse Co., \$31,376 for the electrical machinery, and Allis-Chalmers-Bullock, Limited, \$29,985 for the electrical and \$13,600 for the hydraulic machinery. The latter company having tendered for both the hydraulic and electrical machinery had an advantage over the other two and were awarded the contract.

That the steam turbine is rapidly increasing its foothold in the power field is evidenced by the remarkable increase in manufacture of the well-known Westinghouse-Parsons type. During the six months ending June 30th, 1905, The Westinghouse Machine Company, exclusive builders of the Westinghouse-Parsons type, have contracted for no less than 82,000 kilowatts in turbo-generating machinery, averaging nearly 1,175 kw. capacity per turbine unit. These machines range in size from 200 kw. to 7,500 kw. The latter will be the largest turbines in the world, and three units of this size are under contract for Greater New York railway and lighting power stations. In the distribution of these machines among the various industries, the electric railway has claimed the largest number of machines, averaging 1,496 k.w. in capacity; next in order, industrial plants, averaging 571 kw. capacity, and light and power plants, averaging 1,529 kw. capacity. In the order of total capacity, railway plants have required 38,900 kw., lighting plants, 26,300; industrial, 12,000; miscellaneous, 4,800. The list bears excellent witness to the increasing possibilities of the turbine, and presages a brilliant future. The equipments noted represent solely actual sales only and not including contemplated business or partially closed contracts.

The Elwood Tinworkers Gold Mining Co., of Elwood, Indiana, has ordered from the Merralls Engineering Co. a six-stamp and roller mill, to handle one hundred tons a day, for their mine at Lardeau, B.C. It will be operated by the water power plant to which recent reference was made in the Mining Review. The Craig Gold Mining & Reduction Co., which has the first Merralls stamp mill in operation in Canada, at its Buckingham mine, will shortly add a roller mill. The Merralls Co. has been incorporated in Ontario for the manufacture of mining machinery at London, Ont. Mr. L. A. Morrison is president and manager; Mr. F. D. Woodworth, secretary-treasurer.

The Sullivan Machinery Company is making some important additions to its manufacturing plant at Claremont, N.H., in order to keep pace with the rapid growth of business in air compressors, coal cutters, rock drills and other mining and quarrying machinery. The improvements comprise six new buildings, practically doubling the present plant.

Messrs. Babcock & Wilcox, Montreal, have recently installed boilers as follows:—Canadian Pacific Railway Co., Montreal shops, 1,400 h.p. additional, equipped with Babcock patent superheaters and automatic chain grate stokers; Winnipeg City Water & Electric Light Plant, Winnipeg, Man., 500 h.p., equipped with Babcock patent superheaters and automatic chain grate stokers; Winnipeg Electric Railway Company, Winnipeg, Man., 2,000 h.p., equipped with "Neemes" patent shaking grates, etc.; Dominion Coal Co., Sydney, N.S., 2,500 h.p.; J. R. Booth, Ottawa, 2,000 h.p., boilers and superheaters; Belgo-Canadian Pulp & Paper Co., 500 h.p.; Central Electric Co., Montreal, 200 h.p. additional; Canadian Pacific Railway, Winnipeg, hotel and station, 800 h.p.; Canadian Pacific Railway shops, Winnipeg, Man., 1,500 h.p., with superheaters; Canada Car Co., Montreal, 1,800 h.p., with superheaters; Calgary City Electric Lighting plant, Calgary, N.W.T., 500 h.p., with "Neemes" shaking grates. F. W. Bird & Son, Hamilton, Ont., 75 h.p.; South Western Traction Co., London, Ont., 900 h.p.; Singer Mfg. Co., St. Johns, Que., 1,625 h.p. The Dominion Government last fall installed Babcock & Wilcox marine boilers in the Dominion icebreaker "Montcalm," which was used so successfully in breaking the ice on the St. Lawrence during the past winter. The Babcock & Wilcox Co. are also installing an additional economizer and induced draft plant for the Canadian Pacific Railway at Fort William, Ont.

## THE IRON AND STEEL TRADE IN THE UNITED STATES.

Says the Coal Trade Journal, discussing iron and steel conditions in the United States:—

"Iron and steel and associated products are in demand to such a degree that some of the manufacturers say they are surprised themselves at the volume of tonnage in sight for the next twelve months. It is admitted that the orders already booked will keep mills and furnaces employed at almost limit capacity until well into the second quarter of 1906. Sheets constitute the only item on the list that is regarded as dull, but even here there is expectation of more activity after September 1st. Pig iron is firmer at about old quotations, but sales reported are not in so large a tonnage volume as last month, when buyers evidently sought to cover requirements at the lowest point, and most of them

did so. Out of 41 blast-furnaces in this county, 39 are in blast or will be by the end of this week, and the others as soon as fit for operation. The operations are largely on orders already booked and a new purchasing activity in pig is not expected much before October again. The purchases by the railroads for rails, track supplies and car iron has been a surprise because of the large volume. This is accounted for on the earnings of the roads and the prospects of a large movement of crop products during the winter, which justifies expenditures that have been long needed but held in leash because the money to carry them forward was not previously in sight. Rail orders now booked, with those carried over, including foreign bookings, are authoritatively said to aggregate about 2,700,000 tons, which is pretty close to yearly capacity of all the mills, which is about 3,200,000 tons within the country. Structural materials for bridges, buildings, elevated roadways, ships and miscellaneous uses also embrace a heavy tonnage, while the plate and bar orders constitute a heavy percentage. The iron masters are all in complacent mood, seeing active business with profits ahead for some time, with intimations that before the orders already on hand are filled there will be others of a tonnage that gives promise of a good year for 1906. Machinery makers are busy also, much more so than during the first half of the year. This is due, in large part, to the tremendous development of mining enterprises in the Rocky Mountain States, Alaska, British Columbia and Mexico, to say nothing of countries farther south and abroad. Pittsburg is heavily interested in copper and oil ventures in the West, and machinery orders and pipage and tanks for those sections usually come here.

## WORLD'S OUTPUT OF COPPER

The production of copper throughout the world in 1904 is placed at 1,407,056,000 pounds, an increase of 7 per cent. over the output in 1903. In fact, the average yearly increase for the past ten years has been 7.3 per cent. The average yearly increase in the United States production during the same period was 8.2 per cent. The United States has been creeping up in its proportion of the world's supply until today its mines furnish 55 per cent. of the world's output.

We give herewith the world's production of copper during the past decade, in pounds, and the yearly percentage of increase:—

| Year.            | Pounds.       | Inc. % |
|------------------|---------------|--------|
| 1895. . . . .    | 749,425,600   | ...    |
| 1896. . . . .    | 836,333,120   | 12.0   |
| 1897. . . . .    | 893,659,200   | 6.0    |
| 1898. . . . .    | 961,309,440   | 8.0    |
| 1899. . . . .    | 1,051,254,400 | 9.0    |
| 1900. . . . .    | 1,088,312,960 | 4.0    |
| 1901. . . . .    | 1,444,686,560 | 5.0    |
| 1902. . . . .    | 1,214,453,080 | 6.0    |
| 1903. . . . .    | 1,310,581,440 | 8.0    |
| 1904. . . . .    | 1,407,056,000 | 7.0    |
| Average. . . . . |               | 7.3    |

## ANTHRACITE MINING COSTS.

The cost of producing anthracite coal in the United States has been considerably increased since the recent strike. The following table shows the costs of mining of three important companies—the Delaware, Lackawanna & Western, the Delaware & Hudson, and the Lehigh Coal & Navigation Company. The item of improvements at mines is included in the cost of coal, as it is a necessary part of the expenses of mining, and simply means such development as is really required to maintain the production. The averages given in the table are based on the entire quantity of coal handled by the respective companies:—

|                                        | D.L.&W. | D.&H.  | L.C.&N. |
|----------------------------------------|---------|--------|---------|
| Cost of coal mined and bought. . . . . | \$1.72  | \$2.01 | \$1.79  |
| Improvements at mines. . . . .         | 0.08    | 0.08   | 0.23    |
| Total cost of coal. . . . .            | \$1.80  | \$2.09 | \$2.02  |
| Transportation and selling. . . . .    | 1.79    | 1.14   | —       |
| Total cost. . . . .                    | \$3.59  | 3.23   | —       |
| Average selling price. . . . .         | 3.97    | 3.57   | —       |

The Delaware & Hudson costs include a sinking fund charge for all coal mined from the company's estate, which averages four cents per ton on all coal handled by the company.

## COAL OIL BOUNTIES.

It is estimated that about \$340,000 was paid in bounties on coal oil produced in Canada during the last fiscal year. At the rate of 1½¢ per gallon this would represent a net output of some two and one-quarter millions of gallons of crude petroleum. This output of Canadian wells is, while considerable, of course far short of the total consumption. In addition to the home production there was imported during the year about twenty-two million gallons of coal oil, naphtha, gas oil and the like products of petroleum.



# PROVINCE OF QUEBEC

The attention of Miners and Capitalists in the United States  
and in Europe is invited to the

## GREAT MINERAL TERRITORY

Open for investment in the Province of Quebec.

**Gold, Silver, Copper, Iron, Asbestos, Mica, Plumbago, Phosphate,  
Chromic Iron, Galena, Etc.**

**ORNAMENTAL AND STRUCTURAL MATERIALS IN ABUNDANT VARIETY,**

**The Mining Law gives absolute security to Title, and has been  
specially framed for the encouragement of Mining.**

Mining concessions are divided into three classes:—

1. In unsurveyed territory (a) the first class contains 400 acres, (b) the second, 200 acres, and (c) the third, 100 acres.

2. In surveyed townships the three classes respectively comprise one, two and four lots.

All lands supposed to contain mines or ores belonging to the Crown may be acquired from the Commissioner of Colonization and Mines (a) as a mining concession by purchase, or (b) be occupied and worked under a mining license.

No sale of mining concessions containing more than 400 acres in superficies can be made by the Commissioner to the same person. The Governor-in-Council may, however, grant a larger extent of territory up to 1,000 acres under special circumstances.

The rates charged and to be paid in full at the time of the purchase are \$5 and \$10 per acre for mining lands containing the superior metals\*; the first named price being for lands situated more than 12 miles and the last named for lands situated less than 12 miles from the railway.

If containing the inferior metal, \$2 and \$4 according to distance from railway.

Unless stipulated to the contrary in the letters patent in concessions for the mining of superior metals, the purchaser has the right to mine for all metals found therein; in concessions for the mining of the inferior metals, those only may be mined for.

\*The superior metals include the ores of gold, silver, lead, copper, nickel, graphite, asbestos, mica, and phosphate of lime. The words inferior metals include all other minerals, and ores.

Mining lands are sold on the express condition that the purchaser shall commence bona fide to mine within two years from the date of purchase, and shall not spend less than \$500 if mining for the superior metals; and not less than \$200 if for inferior metals. In default, cancellation of sale of mining lands.

(b) Licenses may be obtained from the Commissioner on the following terms:—Application for an exploration and prospecting license, if the mine is on private land, \$2 for every 100 acres or fraction of 100; if the mine is on Crown lands (1) in surveyed territory, \$5 for every 100 acres, and (2) in unsurveyed territory, \$5 for each square mile, the license to be valid for three months and renewable. The holder of such license may afterwards purchase the mine, paying the prices mentioned.

Licenses for mining are of two kinds: Private lands licenses where the mining rights belong to the Crown, and public lands licenses. These licenses are granted on payment of a fee of \$5 and an annual rental of \$1 per acre. Each license is granted for 200 acres or less, but not for more; is valid for one year, and is renewable on the same terms as those on which it was originally granted. The Governor-in-Council may at any time require the payment of the royalty in lieu of fees for a mining license and the annual rental—such royalties, unless otherwise determined by letters patent or other title from the Crown, being fixed at a rate not to exceed three per cent. of the value at the mine of the mineral extracted after deducting the cost of mining it.

The fullest information will be cheerfully given on application to

**THE MINISTER OF LANDS, MINES AND FISHERIES,**

**PARLIAMENT BUILDINGS, QUEBEC.**



# Ontario's Mining Lands..

**T**HE Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals and extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and sulphides; zincblende, galena, pyrites, mica, graphite, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places, and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. Recent discoveries of corundum in Eastern Ontario are believed to be the most extensive in existence.

The output of iron, copper and nickel in 1903 was much beyond that of any previous year, and large developments in these industries are now going on.

In the older parts of the Province salt, petroleum and natural gas are important products.

The mining laws of Ontario are liberal, and the prices of mineral lands low. Title by freehold or lease, on working conditions for seven years. There are no royalties.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific Railway runs through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

HON. FRANK COCHRANE,

Commissioner of Lands and Mines.

or

THOS. W. GIBSON,

Director Bureau of Mines,

Toronto, Ontario.





## PROVINCE OF NOVA SCOTIA.

Leases for Mines of Gold, Silver, Coal, Iron, Copper, Lead, Tin

— AND —

## PRECIOUS STONES.

TITLES GIVEN DIRECT FROM THE CROWN, ROYALTIES AND RENTALS MODERATE.

### GOLD AND SILVER.

Under the provisions of Chap. 1, Acts of 1892, of Mines and Minerals, Licenses are issued for prospecting Gold and Silver for a term of twelve months. Mines of Gold and Silver are laid off in areas of 150 by 250 feet, any number of which up to one hundred can be included in one License, provided that the length of the block does not exceed twice its width. The cost is 50 cents per area. Leases of any number of areas are granted for a term of 40 years at \$2.00 per area. These leases are forfeitable if not worked, but advantage can be taken of a recent Act by which on payment of 50 cents annually for each area contained in the lease it becomes non-forfeitable if the labor be not performed.

Licenses are issued to owners of quartz crushing mills,

who are required to pay Royalty on all the Gold they extract at the rate of two per cent. on smelted Gold valued at \$19 an ounce, and on smelted Gold valued at \$18 an ounce.

Applications for Licenses or Leases are receivable at the office of the Commissioner of Public Works and Mines each week day from 10 a.m. to 4 p.m., except Saturday, when the hours are from 10 to 1. Licenses are issued in the order of application according to priority. If a person discovers Gold in any part of the Province, he may stake out the boundaries of the areas he desires to obtain, and this gives him one week and twenty-four hours for every 15 miles from Halifax in which to make application at the Department for his ground.

### MINES OTHER THAN GOLD AND SILVER.

Licenses to search for eighteen months are issued, at a cost of thirty dollars, for minerals other than Gold and Silver, out of which areas can be selected for mining, under lease. These leases are for four renewable terms of twenty years each. The cost for the first year is fifty dollars, and an annual rental of thirty dollars secures each lease from liability to forfeiture for non-working.

All rentals are refunded if afterwards the areas are worked and pay royalties. All titles, transfers, etc., of minerals are registered by the Mines Department for a nominal fee, and provision is made for lessees and licensees whereby they can acquire promptly, either by arrangement with the owner or by arbitration, all land required for their mining works.

The Government as a security for the payment of royalties, makes the royalties first lien on the plant and fixtures of the mine.

The unusually generous conditions under which the Government of Nova Scotia grants its minerals have introduced many outside capitalists, who have always stated that the Mining laws of the Province were the best they had had experience of.

The royalties on the remaining minerals are: Copper, four cents on every unit; Lead, two cents upon every unit; Iron, five cents on every ton; Tin and Precious Stones, five per cent.; coal, 10 cents on every ton sold.

The Gold district of the Province extends along its entire Atlantic coast, and varies in width from 10 to 40 miles, and embraces an area of over three thousand miles, and is traversed by good roads and accessible at all points by water. Coal is known in the Counties of Cumberland, Colchester, Pictou and Antigonish, and at numerous points in the Island of Cape Breton. The ores of Iron, Copper, etc., are met at numerous points, and are being rapidly secured by miners and investors.

Copies of the Mining Law and any information can be had on application to

THE HON. W. T. PIPES,

Commissioner Public Works and Mines,

HALIFAX, NOVA SCOTIA.





# DOMINION OF CANADA

## SYNOPSIS OF REGULATIONS

### For disposal of Minerals on Dominion Lands in Manitoba, the North-West Territories and the Yukon Territory.

#### COAL.

Coal lands may be purchased at \$10 per acre for soft coal and \$20 for anthracite. Not more than 320 acres can be acquired by one individual or company. Royalty at the rate of ten cents per ton of 2,000 pounds shall be collected on the gross output.

#### QUARTZ.

Persons of eighteen years and over and joint stock companies holding free miner's certificates may obtain entry for a mining location.

A free miner's certificate is granted for one or more years, not exceeding five, upon payment in advance of \$7.50 per annum for an individual, and from \$50 to \$100 per annum for a company, according to capital.

A free miner, having discovered mineral in place, may locate a claim 1,500 x 1,500 feet by marking out the same with two legal posts, bearing location notices, one at each end on the line of the lode or vein.

The claim shall be recorded within 15 days if located within ten miles of a mining recorder's office, one additional day allowed for every additional ten miles or fraction. The fee for recording a claim is \$5.

At least \$100 must be expended on the claim each year or paid to the mining recorder in lieu thereof. When \$500 has been expended or paid, the locator may, upon having a survey made, and upon complying with other requirements, purchase the land at \$1.00 an acre.

Permission may be granted by the Minister of the Interior to locate claims containing iron and mica, also copper, in the Yukon Territory of an area not extending 160 acres.

The patent for a mining location shall provide for the payment of a Royalty of 2½ per cent. of the sales of the products of the location.

#### PLACER MINING.

Manitoba and the N. W. T., excepting the Yukon Territory.—Placer mining claims generally are 100 feet square; entry fee \$5, renewable yearly. On the North Saskatchewan River claims are either bar or bench, the former being 100 feet long and extending between high and low water mark. The latter includes bar diggings, but extends back to the base of the hill or bank, but not exceeding 1,000 feet. Where steam power is used, claims 200 feet wide may be obtained.

Dredging in the rivers of Manitoba and the N. W. T., excepting the Yukon Territory.—A free miner may obtain only two leases of five miles each for a term of twenty years, renewable in the discretion of the Minister of the Interior.

The lessee's right is confined to the submerged bed or bars of the river below low water mark, and subject to the rights of all persons who have, or who may receive entries for bar diggings or bench claims, except on the Saskatchewan River, where the lessee may dredge to high water mark on each alternate leasehold.

The lessee shall have a dredge in operation within one season from the date of the lease for each five miles, but where a person or company has obtained more than one lease one dredge for each fifteen miles or fraction is sufficient. Rental, \$10 per annum for each mile of river leased. Royalty at the rate of two and a half per cent. collected on the output after it exceeds \$10,000.

#### DREDGING IN THE YUKON TERRITORY.

Six leases of five miles each may be granted to a free miner for a term of twenty years, also renewable.

The lessee's right is confined to the submerged bed or bars in the river below low water mark, that boundary to be fixed by its position on the 1st day of August in the year of the date of the lease.

The lessee shall have one dredge in operation within two years from the date of the lease, and one dredge for each five miles within six years from such date. Rental, \$100 per mile for first year and \$10 per mile for each subsequent year. Royalty, same as placer mining.

#### PLACER MINING IN THE YUKON TERRITORY.

Creek, gulch, river and hill claims shall not exceed 250 feet in length, measured on the base line or general direction of the creek or gulch, the width being from 1,000 to 2,000 feet. All other placer claims shall be 250 feet square.

Claims are marked by two legal posts, one at each end, bearing notices. Entry must be made within ten days, if the claim is within ten miles of mining recorder's office. One extra day allowed for each additional ten miles or fraction.

The person or company staking a claim must hold a free miner's certificate.

The discoverer of a new mine is entitled to a claim of 1,000 feet in length, and if the party consists of two, 1,500 feet altogether, on the output of which no royalty shall be charged, the rest of the party ordinary claims only.

Entry fee, \$10. Royalty at the rate of two and one-half per cent. on the value of the gold shipped from the Yukon Territory to be paid to the Comptroller.

No free miner shall receive a grant of more than one mining claim on each separate river, creek or gulch, but the same miner may hold any number of claims by purchase, and free miners may work their claims in partnership by filing notice and paying fee of \$2. A claim may be abandoned, and another obtained on the same creek, gulch or river, by giving notice and paying a fee.

Work must be done on a claim each year to the value of at least \$200.

A certificate that work has been done must be obtained each year; if not, the claim shall be deemed to be abandoned, and open to occupation and entry by a free miner.

The boundaries of a claim may be defined absolutely by having a survey made and publishing notices in the Yukon Official Gazette.

#### PETROLEUM.

All unappropriated Dominion Lands in Manitoba, the North-West Territories and within the Yukon Territory are open to prospecting for petroleum, and the Minister may reserve for an individual or company having machinery on the land to be prospected, an area of 640 acres. Should the prospector discover oil in paying quantities, and satisfactorily establish such discovery, an area not exceeding 640 acres, including the oil well and such other land as may be determined, will be sold to the discoverer at the rate of \$1.00 an acre subject to royalty at such rate as may be specified by order-in-council.



# DEEP DRILLING

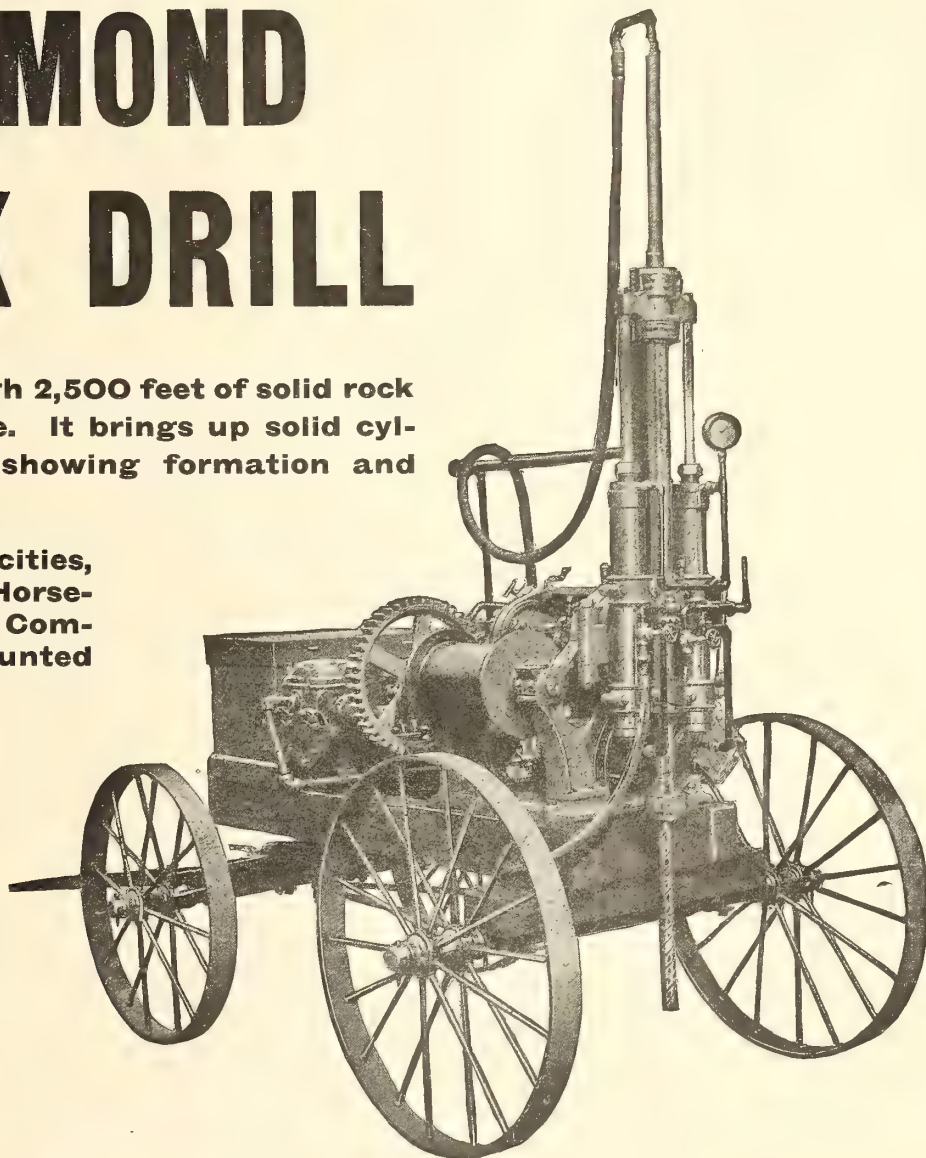
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## Heclon Rock and Ore Breaker

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The only Perfect Gyratory Stone-Crusher

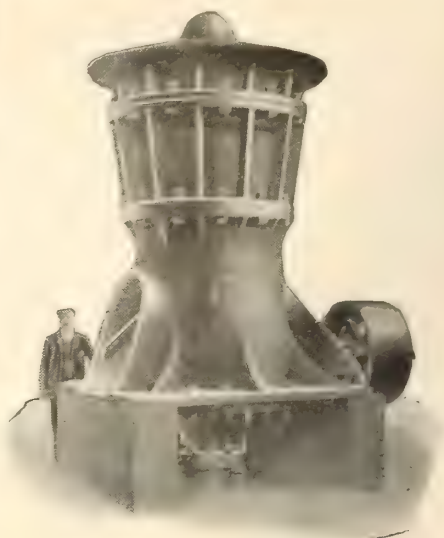
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Sole Representatives of the Hadfield Steel Foundry Company, Ltd., Sheffield, for Canada

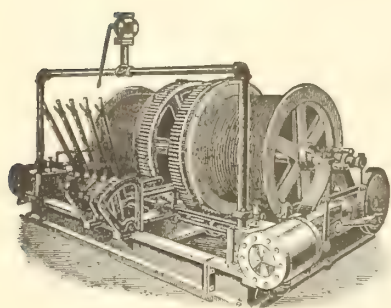
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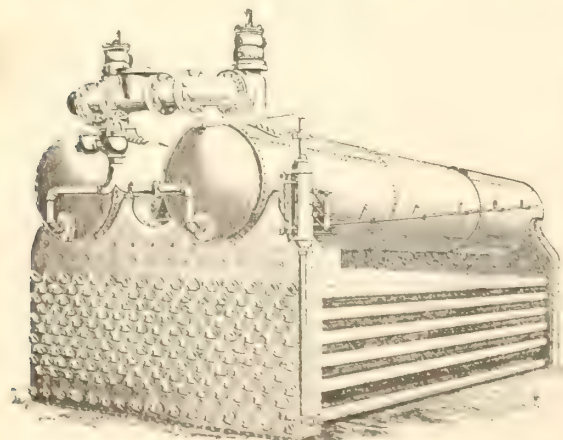
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The Canadian Heine Safety Boiler Co.

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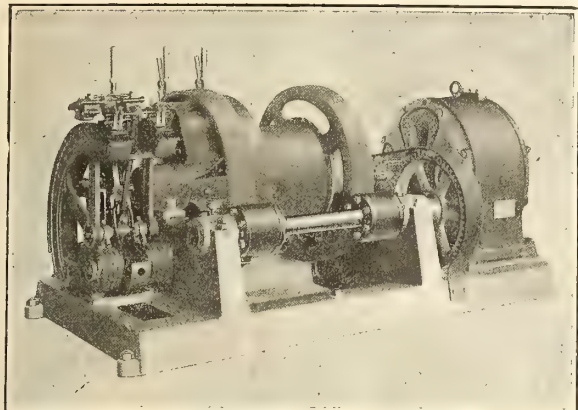
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Westinghouse Induction Motor, Driving Mine Hoist.

The average engineer is not a skilled electrician ; it is therefore important that the driving motors for Blowers, Hoists, Pumps, etc., be mechanically so simple as to be readily maintained by any one of ordinary intelligence.

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## Sydney Mines Bituminous Coal

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International Shipping Piers of the Dominion Coal Co., Limited, at Sydney, C.B.

Shipping facilities at Sydney and Louisburg, C.B., of most modern type. Steamers carrying 5,000 tons loaded in twenty-four hours. Special attention given to quick loading of sailing vessels. Small vessels loaded with quickest despatch.

### **BUNKER COAL**

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By improved screening appliances, lump coal for domestic trade is supplied, of superior quality.

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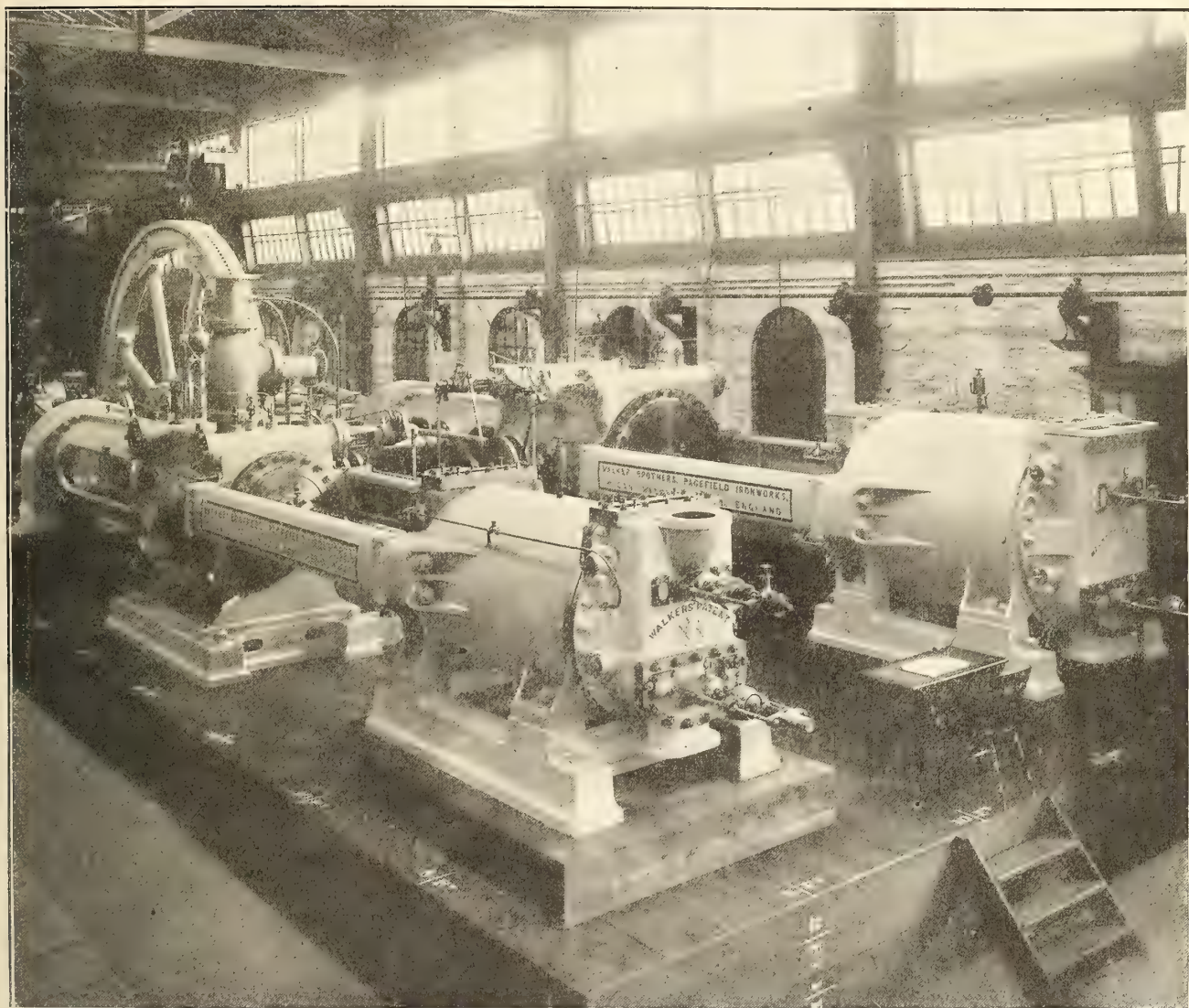
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Cape Breton Coal, Iron & Railway Co. Ltd.

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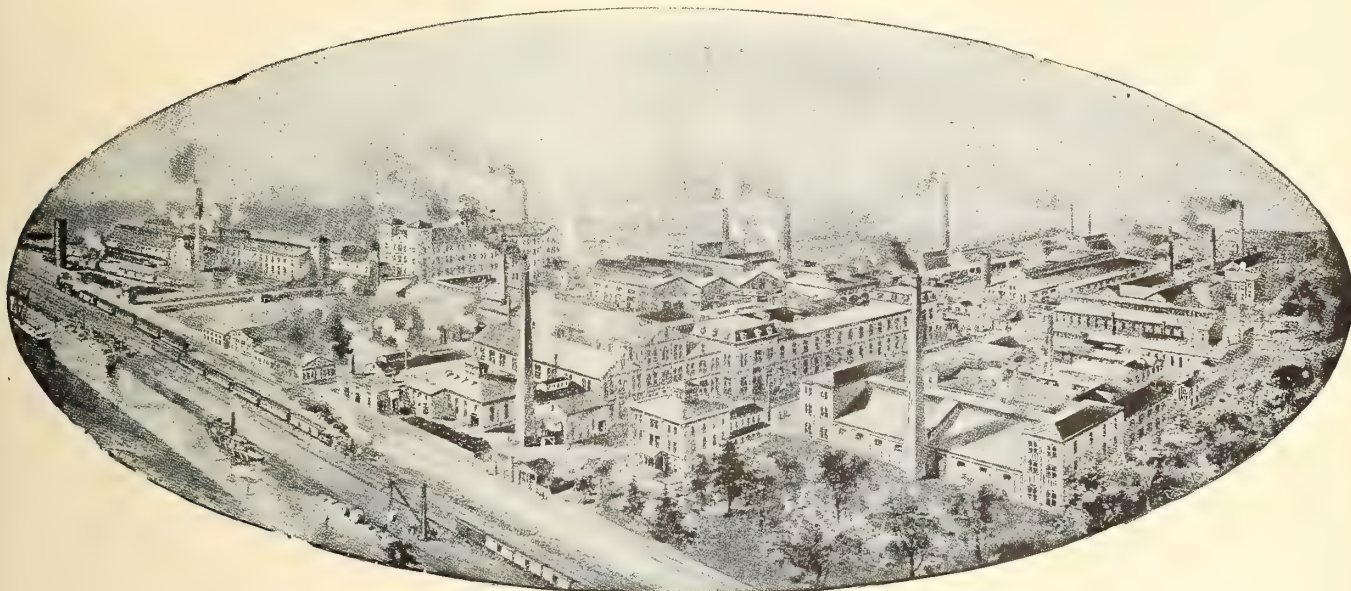
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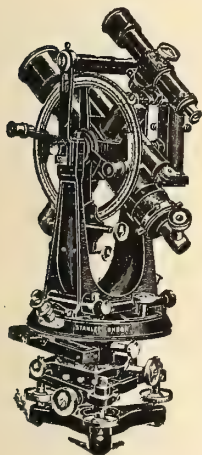


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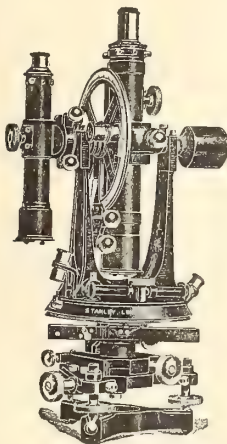
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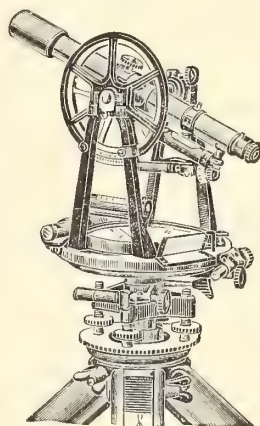
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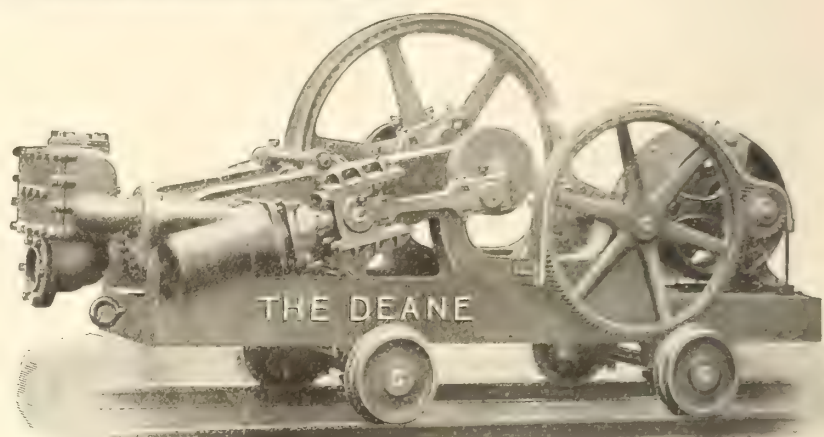
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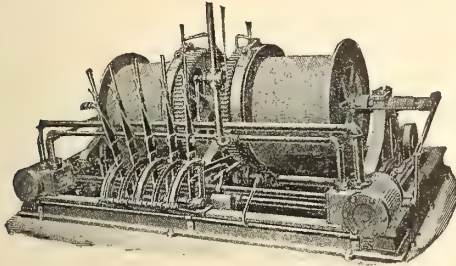


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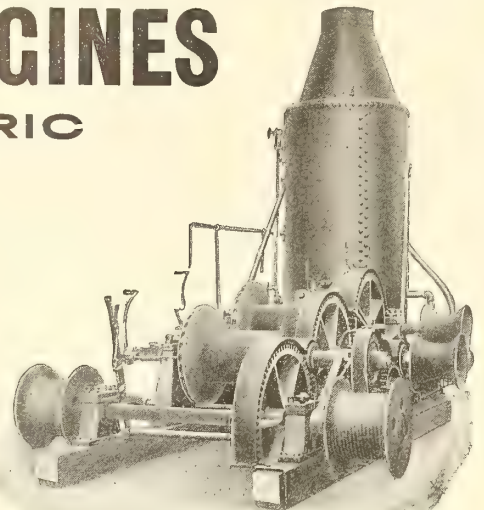
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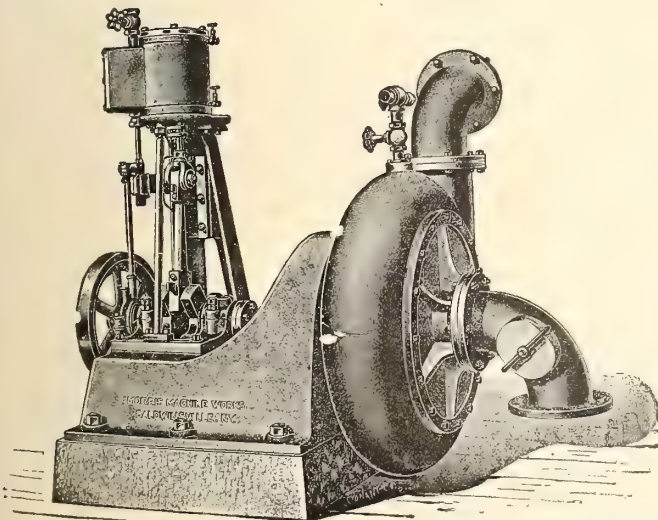
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BY AUCTION, OF THE MINING PROPERTIES, PLANT, MACHINERY AND ASSETS OF

#### LAURENTIAN MINING COMPANY, Limited.

Under the direction of J. A. McAndrew, Esquire, Official Referee, there will be sold by Messrs. Suckling & Co'y, Auctioneers, at their auction rooms, 66-68 Wellington Street West, in the City of Toronto, on Saturday, the sixteenth day of September, 1905, at the hour of twelve o'clock noon, the mines, plant, machinery and assets of Laurentian Mining Company, Limited, as follows:—

Mining locations in Manitou Lake Region, District of Rainy River, Algoma, Province of Ontario, Canada, consisting of H. P. 400, H. W. 21, H. W. 22, H. W. 207, H. W. 252, H. W. 265, H. W. 266, H. W. 267, H. W. 248, and H. P. 371, aggregating 577 acres more or less, together with buildings and machinery as per inventory, amounting to.....\$38,444.98

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Mining locations situate in Manitou Lake Region, District of Rainy River, Algoma, Province of Ontario, Canada, consisting of the following:— H. P. 377, S. 39, S. 40, S. 41, S. 42, H. W. 206, H. W. 255, H. W. 326, H. W. 327-8-9, H. W. 330, H. W. 331, H. W. 626, H. W. 749, H. W. 750, H. W. 751, H. W. 772, H. W. 773, containing in all 1,050 acres, more or less.

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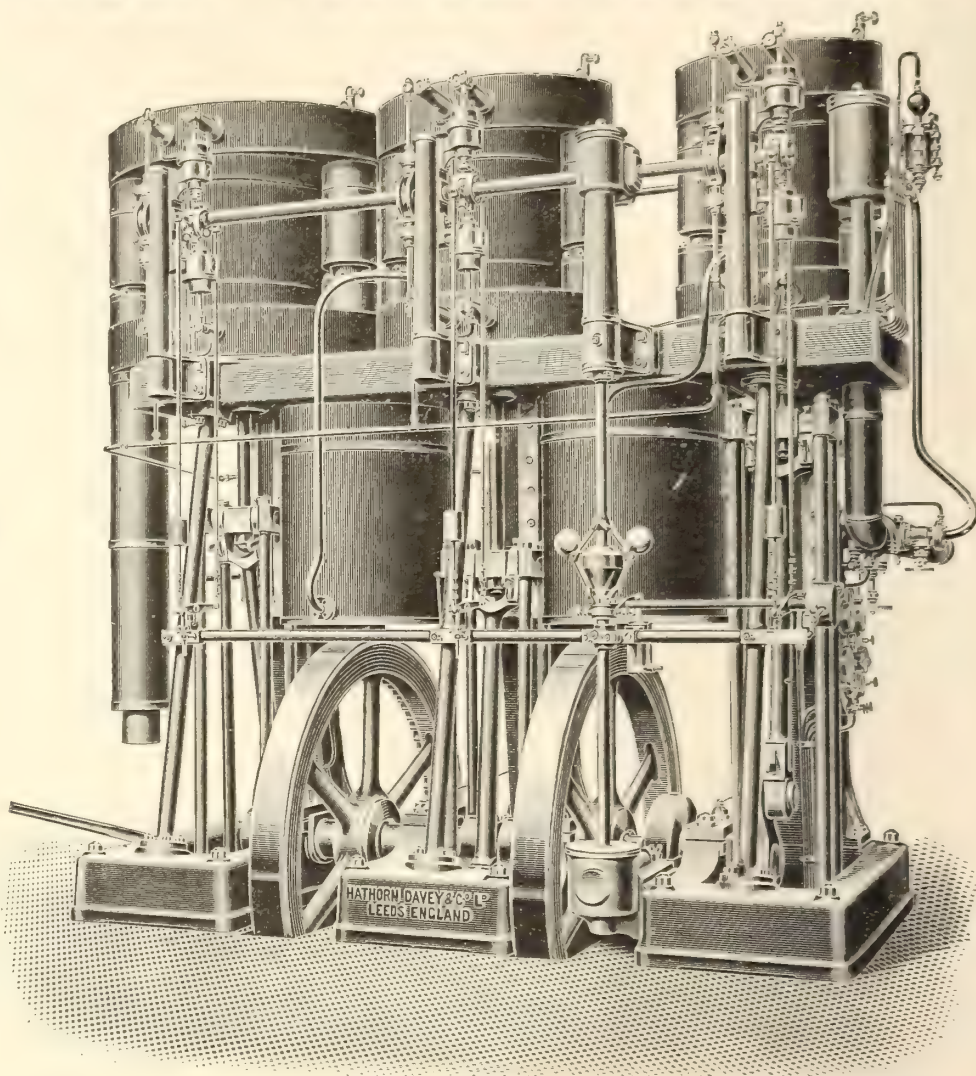
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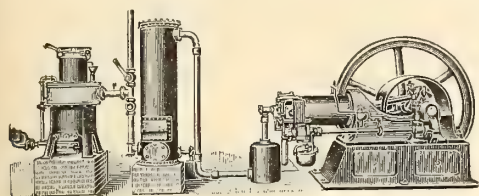
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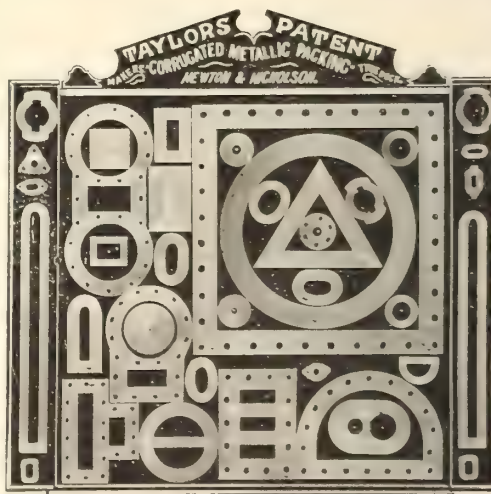
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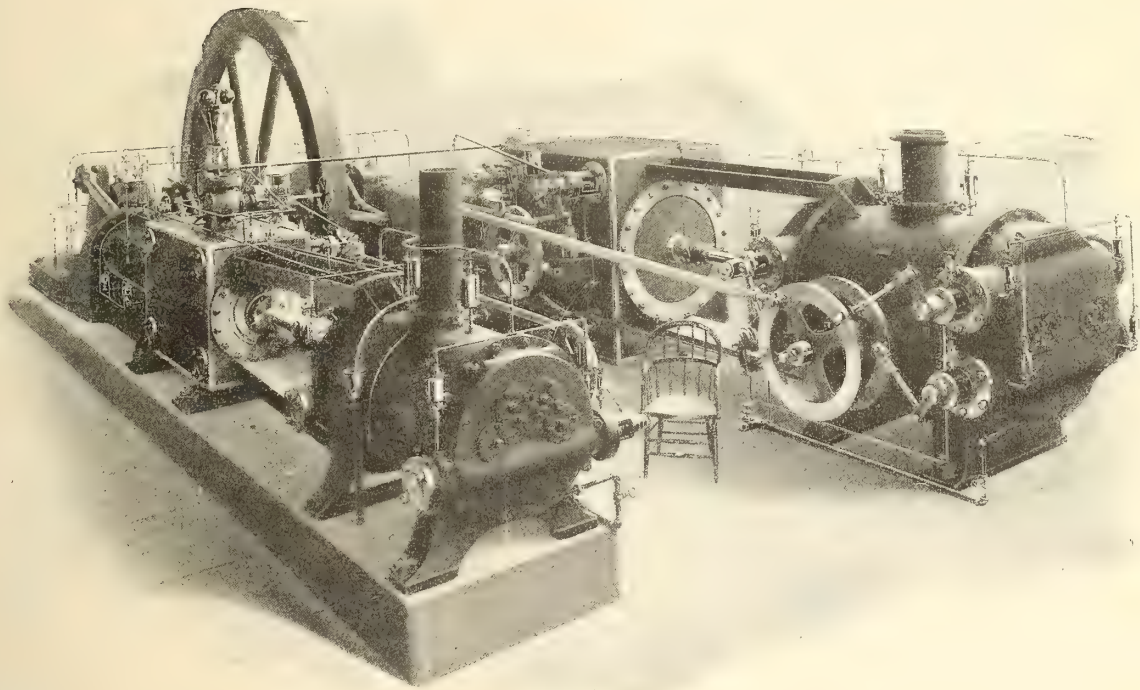


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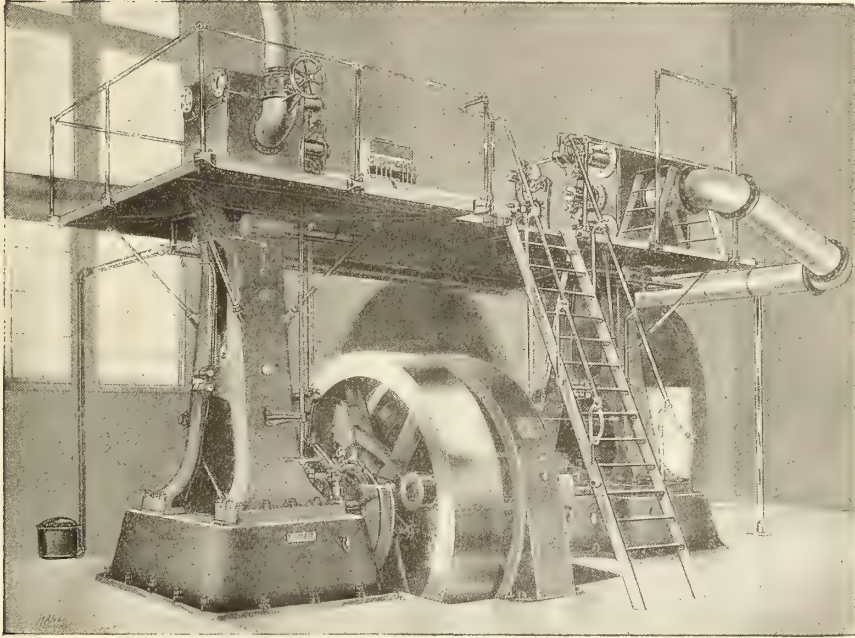
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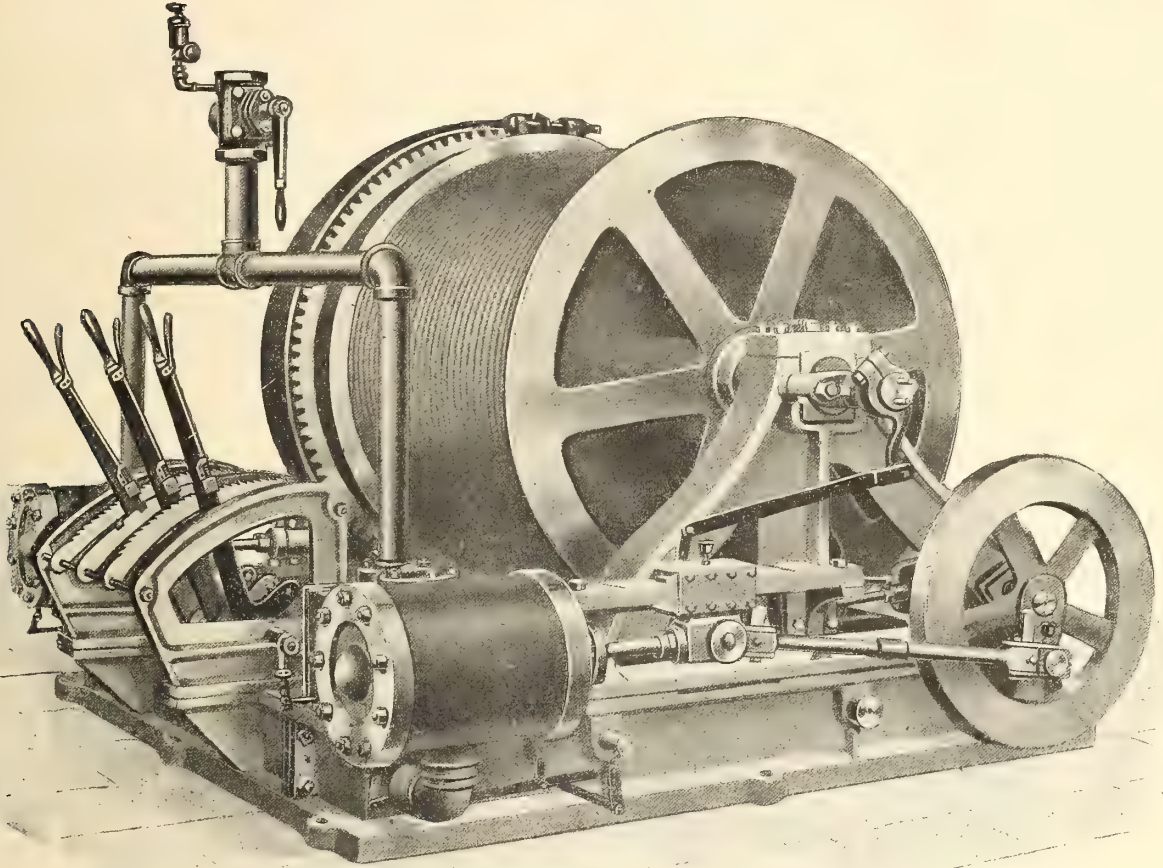
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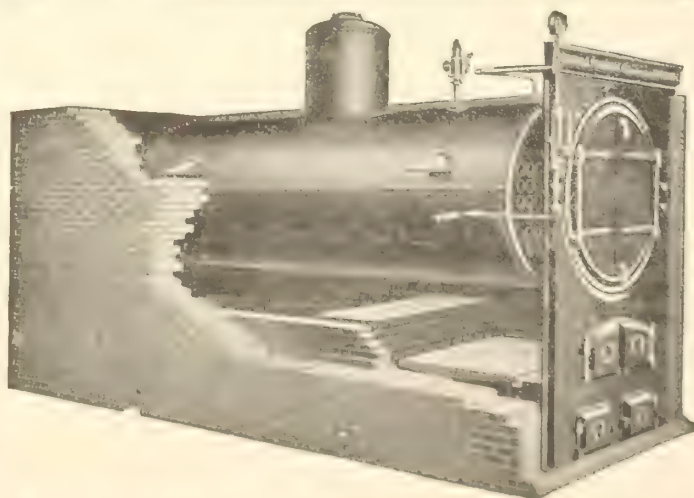
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Fort Frances, Ontario, is much delighted with the report of a Dr. Lawrence, who, in company with Mr. J. H. Hall, has recently visited the iron region north of Fort Frances and near Pipestone Lake. Dr. Lawrence is reported to have said that he considers the Pipestone range as the "greatest iron range on this continent." It is regrettable that the Doctor did not impart to the local reporter some facts as to the composition of the ores, their contents in iron, silica, sulphur, etc., and some equally important facts as to the freedom of the deposits from intercalated bands of stone. Such information might qualify the word "greatest" in the Doctor's statement.

It is stated that the gold mining areas of the Yukon are suffering this year from a shortage of water, and in consequence the output from the North this season will again show a further decrease. Meanwhile, the assistance of the Federal Government in the building of dams and reservoirs to insure in future a more constant supply of water is being sought, and as in a recent speech Mr. McInnis, the newly appointed Governor, expressed the view that aid in this direction should and probably would be accorded, the petition of the miners will doubtless meet with a favourable reception. The Yukon, it may be remarked, is, perhaps, in this regard, fortunate in being a territory and not a province.

The newspaper reports anent a Government smelter at or near North Bay should be taken only for what they are worth. In all probability such a smelter would quickly get into the hands of a few men, and would not, ultimately, be of advantage either to the Province or miners. Probably this talk of a Government smelter has arisen from the activity of various members of the Government and its employees in connection with the rumored incorporation of a million dollar company. Also there is evidence of other substantial people erecting reduction works for the treatment of nickeliferous pyrrhotites from any part of Ontario, as well as the argentiferous cobalt ores of Temiskaming. The more the merrier for the miner—but certainly not the merrier for the capitalist. Competition will evolve cheaper methods and lower costs, even though the interest earned on capital is decreased. Then by all means let there be competition, but first (it might be whispered) let there be an assured life to deposits: at present there is none.

Here is a very fine specimen of mining news as she is "writ," which, by the way, has been freely published by the London financial press, notably the *Rialto*. The suggestion of a "torrent of gold flowing to the cities of the North West" is decidedly "rich." We observe that the *Rialto* credits this startling piece of intelligence to the *Mining and Engineering Review* of San Francisco:—

"A vast field of placer gold, hidden for centuries beneath the swirling sands of the turbulent Fraser River, will this year be trodden by thousands of



eager men, many of whom have grown grey for an opportunity to delve into the submerged wealth. Not in almost half-a-century, since 1858, has the stream been so low nor the bars of golden sand so exposed, and it is predicted that the torrent of gold that will flow to the cities of the North West from Hope, B.C., the headwaters of the Fraser, 700 miles distance, will be greater in 1905 than in all the years since the memorable rush of the fifties. Hundreds of miners are rushing to the placer fields, and it is said that thousands will swarm over the bars in a few weeks. The bars, which have not been disturbed since 1858, are reported to be exceedingly rich in gold. Great excitement prevails on Puget Sound and in British Columbia."

The Canadian Copper Company having decided to build a plant for the treatment of the auriferous mispickel ores coming from the "Big Dan" and "Leckie" properties in the Temagami Lake (Nett Lake) region, have lost no time in putting this decision into practical form. A stack is now building of a capacity to treat 100 tons of ore daily, as a minimum, and the condensation chambers for recovery of the arsenic values are also under way. The framing of the building to cover the furnace is completed, and the work of putting on the iron covering is well advanced. The plant is located at Copper Cliff, and, when completed, will represent an investment of rather over \$50,000. For the gold and silver values in the mispickel the Company will pay 95 per cent. of the assay value, and will also pay for arsenic contained at the price of one cent per lb. For nickel and cobalt values no permanent scale has been made, but it is understood that the basis of Mr. E. P. Earle's offers will be adopted, viz.:—For quantities above 5 per cent., 12c per lb. for nickel, and 35c per lb. for cobalt. The connection between Mr. Earle and the International Nickel Company, which has been conjectured for more than a year, is now admitted. It is also certain that Ledoux & Co. will attempt the erection of sampling works near Cobalt if the miners give the firm encouragement.

There is a great deal of ignorant and loud clamor urging the Ontario Government to impose royalties on the rich cobalt ores of Northern Ontario. If such a course be now adopted it would be illegal and wholly unwarranted. A royalty is a form of taxation, and the Legislature not the Government is alone able to authorize taxation. It is true there was formerly in force in the Province a system of royalties, but subsequently all royalties were abolished by the Legislature, and this was done unanimously as such a system of royalties was found injurious to the public interests. The present mining laws of Ontario give to prospectors a statutory right to explore on public lands with certain exceptions and carefully define the terms on which lands found to be valuable for minerals may be acquired. Faith should be kept with prospectors and explorers, and the conditions on which they may acquire mining claims should not be arbitrar-

ily changed without due notice. It may be that changes should be made in the Ontario Mining Laws, but such changes should be made only after careful consideration and after full discussion in the Legislature. Nothing is more important than a permanent, stable mining law, and it is therefore desirable that the amendments made to the Ontario Mining Law at the next session of the Ontario Legislature should be well and carefully considered. We would recommend to those concerned a careful study of the provisions of the mining laws of Mexico.

We have received a communication from a Mr. F. G. Hartmann, of New York, calling attention to a competition that has been inaugurated by the International Association for Labour Legislation, of Basel, Switzerland, offering prizes aggregating several thousand dollars for the best treatise on the effective prevention of lead poisoning to which men employed in mining, milling, smelting and refining of lead ore are subject. Prizes are offered as follows: A prize of \$1,200 for the best treatise on the prevention of lead poisoning in the operation of mining and milling lead ores or ores containing lead. A prize of \$2,400 for the best treatise on the prevention of lead poisoning in smelting and refining works. Two prizes, viz.: One first of \$600; one second, \$360 for the best treatises on the prevention of lead poisoning in the chemical application of lead, as in white lead works, manufacture of other lead paints, of electric accumulators (storage batteries), etc. Four prizes, viz.: One of \$360; one of \$240; two of \$180 each, for the best treatises on the prevention of lead poisoning in the trades of house, ship, coach-painting, interior decoration, varnishing, and the like. Four prizes, viz.: One of \$360, one of \$240, two of \$180 each for the best treatises on the prevention of lead poisoning in those trades where raw and manufactured lead are consumed or handled on a large scale, as in type foundries or printing offices. The competition closes on the 31st of December, 1905. Any of our readers desiring fuller particulars would do well to apply to either Mr. Hartmann, whose address is 327 Central Park West, New York, or to the International Labour Office, Basel, Switzerland. The present object of the Association is to be commended, and we trust that the competition will be productive of suggestions of real value.

The London correspondent of the *Engineering and Mining Journal*, writing recently in reference to the affairs of the Tyee Copper Company, remarks that after the rosy reports of a year ago, the present position of affairs, by which it is stated that the ore body is showing signs of exhaustion, has caused considerable surprise. The writer continues, that up till quite recently it was supposed that the company's affairs were on an excellent footing: that the ore bodies were extensive and developing well, and the smelter in full operation, making an excellent profit. If these were really the impressions obtaining until recently in London, it was certainly not



the fault of the mine management, as Mr. Edward Musgrave, in his report of 1903 and 1904, emphatically points out that the future of the mine depended on the successful exploitations at depth, while it was mentioned last year that the indications were none too promising. The correspondent proceeds to say that as the control of the company has now changed hands and Mr. Livingston's friends are in the minority on the Board, the policy and methods in the management of the mine will be changed to some extent. It is difficult to see how the mine and smelter management of the last two or three years, which has been conservative and sound in every particular, can be greatly improved on; in fact, had every British owned mine in British Columbia been operated as efficiently and economically as has the Tyee since (say) 1902, the British public would have little to complain of in this respect, and the percentage of failures would have been materially lessened. After all, the original Tyee shareholders have not done very badly, and have really no very serious ground for complaint, since they have already received a fair return on their investment. Meanwhile, there is, of course, still hope that new ore bodies will be encountered.

It is some time since metal market conditions, more especially in respect to the prices of copper, silver and lead, were so satisfactory to the miner as at present, and British Columbia in particular has great cause for rejoicing with copper in the neighbourhood of sixteen cents, silver at over sixty, spelter at nearer \$5.75 than \$5.50 and lead on the London market at over £14 10s—though in the latter respect the advance in market prices will exert a lesser influence on production in this country, since there will be a corresponding decrease in bounties paid under the conditions of the Act. But British Columbia is first and foremost a copper producing country, or, rather, its reputation and future importance as a mineral region will largely rest on the successful development of copper mines. The average price of copper in 1904 was, and on this basis the value of the province's copper output was \$4,578,037. Had the average price of copper been fifteen cents last year the value of this production would have been available for distribution in the form of dividends to investors. The case might perhaps, however, be put more plainly by assuming that (say) the Granby Company is mining 1 1-2 per cent. copper ore, which with copper at eleven cents is equal to \$3.30 per ton; with copper at sixteen cents this same ore (for this purpose, not taking into account gold or silver values) is worth \$4.80 per ton. As the Granby Company is now mining in the neighbourhood of 12,500 tons a week, an advance therefore of \$1.50 per ton in copper values is equivalent to a gain of \$18,750 on the weekly output of ore, or roughly \$950,000 per annum. Other copper companies operating on a large scale in the Boundary district of British Columbia and the Ontario nickel-copper and copper producing properties will, of course, benefit in a proportionate degree. Present

copper prices are, perhaps, somewhat abnormally high, though taking into consideration the enormously increased consumption even this is questionable. The conditions to-day, in short, are very different to those obtaining in 1901 when high prices were the result of manipulation. The steady upward tendency of values which has taken place this year is evidently in obedience to the law of supply and demand, for if production is now greater than it has ever been, consumption shows a still larger ratio of gain, and has absorbed all the accumulation of recent years.

It is not often that we have occasion to commend the utterances of the daily press of Ontario when mining affairs are the subject of discussion, and it is, therefore, a pleasant duty to endorse the opinions as expressed by the *Toronto Mail and Empire* in a recent leading article on the subject of "Americans in Temiskaming." Much frothy boomistic and inexpensible nonsense has been published of late in the columns of the *Toronto Globe*, which seems to have profited nothing by the history of the last few years of Canadian mining, either east or west; and this important newspaper has had scores of imitators who have repeated the silly cry on the danger of allowing aliens to obtain control of valuable properties in the new district. Demands for the imposition of a big royalty, for the reduction of the size of claims "in the interest of the poor citizen" (save the mark!), and for the exclusion of foreigners are but a few of the ill-considered proposals set forward. When, therefore, the *Mail and Empire*, in a calm and dispassionate manner, discusses the desirability of permitting aliens to develop the mines of the province, it is a matter worthy of remark and congratulation. Our contemporary thus adequately comments on the situation:

"In some quarters concern is expressed at the interest taken by Americans in the ore deposits of Temiskaming district. Attracted by the remarkable discoveries made there, hundreds of mining men from the other side of the line have gone into the district to locate and acquire claims. When a promising claim is offered for sale these newcomers are usually keen bidders for it. This activity excites apprehension in the minds of sane Ontario people, and moves them to suggest that measures be taken to prevent aliens getting possession of the district. It is highly desirable that Canadians or other British subjects should take the lead in developing the mineral wealth of the Temiskaming country, and that they should receive the fair fruits of their enterprise. But the working of the mines and the rendering of their contents into merchantable products are of more public importance than is the pecuniary advantage of any individual, whether citizen or alien. The minerals are in the earth, and can be of no use to the country until they are taken out and utilized. If in our own country the enterprise required for their conversion into wealth is lacking, then it ought to be welcomed when it comes forward from some other country. Citizens of the



United States could be debarred from the right to hold mining lands in Ontario. To place them under such a disability would be no more than is done in several of the States with regard to aliens generally. But it would be illiberal, and would retard the development of the province's mineral resources. The fewer restrictions there are on the buying and selling of mining rights the less is development likely to be checked by the speculative holder. It is indispensable that our mines be opened, whether by foreign capital or by Canadian. But it is desirable that the series of manufacturing processes to which the ores are to be subjected should be carried on as far as possible in Canada."

All of which is both timely and logical.

Dalhousie University is to be very heartily congratulated on the energetic and commendable steps that are now being taken in the direction of establishing classes for miners in the important centres of industry, such as Springhill, Stellatron, and, it is hoped, Sydney Mines. Prof. McKay, in an interview with the Sydney Mines Star, points out that these classes are especially intended to help men who have already passed through the government mining schools to continue their work; and in order not to duplicate the teaching of a grade of work for which provision is already made in local mining schools and in night schools, it is intended that there shall be a certain scholarship requirement for admission to the classes. The requirement for admission is such as can be readily met by students who have passed through the schools. The college proposes to offer three classes in Mathematics, and two in coal mining, besides classes in Drawing, Mechanics, Surveying, Chemistry, and Geology and possibly also in first aid to the injured. The classes in Mathematics, Drawing and Mechanics will extend over about six months of the autumn and winter, while the class in surveying and probably also those in Chemistry and Geology will be conducted in the spring and summer months. In Sydney Mines, where steel-making is a great industry as well as coal mining, the necessity of providing classes in the chemistry and metallurgy of iron and steel will be kept in view.

The scholarship requirements for admission will, it is hoped, give a healthy stimulus to local night and mining schools. The lowest requirements for any class is that a student shall have a knowledge of the ordinary rules of Arithmetic, including common and decimal fractions. Where there are no night schools enabling men to come up to this requirement, the college will undertake to conduct a preliminary class for the purpose, if other satisfactory arrangements cannot be made.

The class fees will be made as moderate as possible. The fee for any one class will not be more than five dollars at most, and in case two or more classes are taken at the same time, a substantial reduction in fee will be made. A student will be free to take only one class at a time or if he chooses as many classes as he is found fit to enter. By this

arrangement a man or boy with very little time to spare and very little money will be able to gain an education such as is now costly and in many cases wholly out of his reach.

#### GOVERNMENT BY ORDER-IN-COUNCIL IN ONTARIO.

It is, perhaps, not too much to say that unwise legislation is responsible for nine-tenths of the misfortunes which have befallen the mining industries of Canada during recent years. For example, the very ill-advised anti-alien act exercised the most disastrous effect in retarding the development of the Atlin gold fields; British Columbia's mischievous eight-hour law played havoc in the silver-lead districts, while recent legislation along similar lines is largely responsible for the strike and consequent suspension of operations at an important Vancouver Island colliery; industry in the Province of Quebec at one time suffered from the attempt to impose a special tax upon mine equipment; while but for the prompt action of the Canadian Mining Institute the Sudbury nickel industry in Ontario would have been heavily handicapped by ill-considered legislation. There is now grave cause to fear that in consequence of crassly ignorant and foolish departmental interference the development of the new silver-cobalt areas in this province will be checked if it be not strangled. While the Ontario mining law itself is defective in many respects, the special regulations recently enacted by Order-in-Council to govern in the Temiskaming division are unjust, inequitable, and, we believe, illegal. On April 5th of this year the Regulations for Mining Divisions already in force in Michipicoten were amended, approved, and made to apply to Temiskaming by Order-in-Council. According to sections 15 and 16 of these regulations the holder of a miner's license is entitled to "explore any portion of the Mining Division named in his license," and (section 16) having discovered a "vein, lode or other deposit of ore or mineral in place" has the right to stake out a claim (section 21) not exceeding forty acres in area. In so far as here set out the conditions are reasonably clear and not ungenerous. But during the last few weeks, presumably with the commendable though quite mistaken desire of better protecting the public interests, the Provincial Government has amended these regulations by Orders-in-Council, the first of which, authorizing the appointment of inspectors to pass on the validity of locations, disregards the affidavits of applicants, and a second order more recently issued provides for the entire withdrawal of the lands in the Townships of Coleman, Bucke, Loraine, and Hudson from sale or lease, until the Government shall have had time to prepare a fresh set of regulations, which we understand contemplate the reduction of the size of claims to five acres, and the imposition of a royalty on output. It is really difficult to imagine on what grounds such entirely autocratic proceedings can be justified or excused. In no other country—we go farther, in no other pro-



vince of Canada—would they be tolerated for an instant, and we feel reasonably safe in asserting that locators who have staked ground in good faith and in compliance with the original regulations, will have little difficulty in compelling the Ontario Government to respect their unquestioned rights. It meanwhile speaks well for the law-abiding disposition of the present population of this mining section that disapproval of these preposterous orders has not gained expression in deeds of violence. Even in British Columbia, where the law is as much respected as anywhere, a mine inspector who attempted to carry out the instructions which have been given to the Cobalt officials would be right in anticipating a rough handling. In all civilized countries, and even in some which do not properly come within that category, the affidavit or oath is accepted as the only legal form of proof. In Ontario seemingly this is not now the case, for, in direct opposition to the prescribed regulations, the affidavit made by the locator of a claim is no longer accepted, but he is in addition called upon to prove to an inspector of mines that he has discovered mineral in place. It will be observed that it rests with the Inspector to say whether or not the location is a valid one. If, in the opinion of that official, a valuable discovery has not been made (the regulations, by the way, make no mention of the word "valuable"), the locator is instructed to remove his discovery stake and the ground is declared open for re-location. There are, we are informed, no less than three inspectors in the district engaged in this very extraordinary duty, and to make confusion rather worse than confounded none of these officials in question are agreed on what does or what does not constitute a "valuable discovery." Thus one inspector maintains that "shipping ore" is a *sine qua non*; another insists on "metallic silver"; and the third requires that the ore shall carry cobalt and nickel. Could any situation be more utterly farcical?

It is, however, no laughing matter for the men who have expended time, energy, and, to a greater or lesser extent, money in prospecting and exploiting this region; and the Government's line of action must necessarily, unless immediate steps are taken to provide redress, exert a very harmful effect in discouraging the investment of capital, in this, or any other mining territory in the Province. We must postpone, in recognition of the exigencies of space, a full discussion of the proposals in respect to the imposition of royalties and the reduction in the area of mineral locations to five acres. But the first is quite premature, the second is simply foolish if mining upon a commercial basis is to be conducted at all. The fact is, that the Ontario Government is confronted with a situation not previously experienced, and is being influenced by ignorant public opinion as voiced by a necessarily ignorant press. In the West, Ontario is described as the "cent belt." We do not wish to be discourteous, but is not this designation somewhat justified by the present penny-wise pound-foolish policy? A country may lay claim to a great natural wealth, but until these

resources are developed they are unreckonable factors in an estimation of the national prosperity. Ontario's new mineral area may or may not prove what is now popularly believed concerning it. If the veins are permanent and values continue in depth then it will be one of the richest silver-producing areas in the world and a great source of wealth to the province. The shipment during the past twelve months of surface ore to the value of even a million and a half dollars demonstrates very little beyond the obvious fact that the ores, as so far developed, carry extraordinarily high values. This has already proved an excellent advertisement for Ontario. Provided the Government has the good sense to allow matters to take a natural course, we may look for a large influx of capital and the beginning of an era of unexampled mining activity in the Province. By this, the desire of the public to share in the riches of this new region will be best realized in the general prosperity following its development.

#### A GERMAN OPINION OF THE CANADIAN EXHIBITION AT LIEGE, BELGIUM.

(Translated for the CANADIAN MINING REVIEW, from *Stahl and Eisen*, by F. Cirkel, M.E.)

It is gratifying to note the laudatory references appearing in European technical papers to Canada's mineral exhibit at Liege, Belgium. *Stahl and Eisen*, the official organ of the German Trans-Metallurgists and the most important of the German periodicals published in the iron and steel interests in its August number, speaks of the Canadian exhibit as follows:—

"Of all the foreign non-European countries the exhibition of Canada commands the highest respect and attention of the visitor both as regards its completeness and practical arrangement; indeed, it is not too much to say that Canada is the only country really adequately represented at the Liege Exhibition.

The Canadian Exhibition Building, erected in the Ionian style, is situated in the Park de la Boverie; to the right is located the building for historic art, to the left the palace of art and opposite the entrance one notices the building of the lace exhibit. It has a length of sixty meters, a width of thirty-five meters, a height of twenty meters and its entrance is overbuilt by an imposing tower, which bears the Canadian coat-of-arms.

Of special interest to metallurgists are the specimens of ores, economic minerals and metallurgical products which are exhibited in the rear of the building. Canada, as we all know, is rich in coal, iron, gold, silver, lead, copper, zinc, nickel, cobalt and manganese; quicksilver and platinum occur also, but are of minor importance. The value of the total mineral productions of the country has increased enormously in the last ten years. Of the exhibits may be mentioned the titaniferous magnetites from the Quebec & Lake St. John Railway Co., Quebec; magnetite from the Boyd Caldwell mine, Bagot,



J. P. Renfrew Co., Ontario; hematite from the Broome Company, and hematite from the St. Helen mine, Michipicoten district. Besides these there are exhibited iron ores from the Londonderry mines in Nova Scotia, owned by the Londonderry Iron & Mining Co., Ltd., and hematite and limonite from Cooper Brook, Colchester, N.B.

Some beautiful manganese ore is exhibited by the Pictou Company of Bridgeville, N.S. These specimens with their magnificent crystals would be a great acquisition to any mineralogical museum. Of chrome ores are exhibited: Chrome iron ore from Black Lake and the Megantic Mining Co., in Quebec.

The nickel, cobalt and silver ores from Haileybury, Nipissing district, Ont., represent a value of approximately 60,000 francs. Nickel and copper ores of the Victoria mines in the Algoma district, Ont., are exhibited by the Mond Nickel Co. The Canadian Copper Co. shows nickel ore from the Sudbury district, Ont., and also wire, tubes and vessels manufactured from metallic nickel. It is generally known that Canada supplies over half the world's consumption of nickel.



The Canadian Pavilion at the Liege Exposition.

Of the rarer ores may be mentioned:—Molybdenite from Harcourt township, Haliburton, and of the Victoria Co., Ontario; from the Alleyn Township, Pontiac Co., and Ashfield township, Que., from Egan township, Wright Co., Que., and from Grand Prairie, British Columbia. Wolframite from Emerald, Margerie, Inverness Co., N.B.; and Scheelite from Willow River. There is also to be seen an unmarked radium ore from Cap d'Or in Cumberland Co., N.S., Coal from Cumberland, B.C., coal oil, peat, graphite, corundum, mica, asbestos and many other economic minerals in this section of the magnificent Canadian exhibit.

Of metallurgical products, pig iron is shown of the following composition:—

|    |       |       |      |       |       |       |      |      |
|----|-------|-------|------|-------|-------|-------|------|------|
| Si | 2.5   | 3.45  | 2.54 | 2.72  | 2.67  | 4.6   | 5.28 | 6.72 |
| S  | 0.022 | 0.006 | 0.08 | 0.007 | 0.011 | 0.007 | 0.04 | 0.28 |
| P  | 0.96  | 1.11  | 0.91 | 0.98  | 0.98  | ...   | ...  | ...  |

The Londonderry Iron & Mining Co. have exhibited ferrosilicum with 8.19 silicum, 0.28 per cent. sulphur and 0.78 per cent. phosphorus. The Electric Reduction Co., of Buckingham, P.Q., show beautiful specimens of ferrosilicum and ferrochrom.

## PLACER MINING METHODS AND COSTS IN THE NORTHERN GOLD FIELDS.

A recent valuable addition to the already numerous and important monographs published by the United States Geological Survey bears the title "Methods and Costs of Gravel and Placer Mining in Alaska," by Chester Wells Purington. This title, however—and this is the only criticism we have to make on the publication—is somewhat misleading in that the author devotes a quite considerable proportion of his space to dealing with conditions in the Canadian territory of the Yukon and the British Columbian district of Atlin. The work, in fact, will necessarily prove of great interest to both Canadian and American readers. In passing, it may be worth noting, as bearing on the remarks contained in an article published in the last issue of the CANADIAN MINING REVIEW, on "A National Department of Mines," that although Mr. Purington did not start on his journey until May 26th of last year, his report, which comprises a volume containing upwards of three hundred closely printed pages, many statistical tables and numerous excellent maps and photographs, was transmitted to the Department of the Interior early in February last, and was distributed in the form of a bulletin in June, which, considering the circumstances, is an excellent example of the promptitude characterizing the methods of the United States Geological Survey.

In all, Mr. Purington spent five months in the field, and over a month of this period in British territory. Canada, it is pointed out, affords excellent opportunity for securing information relative to road construction applicable to the Alaska Interior, for already over three hundred miles of waggon road have been built by the Canadian Government in the Yukon territory and the Atlin district, while, in addition, over six hundred miles of sled roads have been made in the Yukon. The excellence of these roads is indicated by the fact that in the summer not only waggons and vehicles of all descriptions, but even bicycles, may be seen daily about Dawson, the Klondike creeks and Atlin. On the other hand, there are less than fifty miles of well-built waggon roads in Alaska, and these have been constructed by private enterprise.

As is more or less generally known, mining conditions in the North are dissimilar in many respects from those obtaining in other placer mining fields; thus, gravel miners from other parts of the world find that much of their previous experience is of no special benefit and methods which have been condemned or tried with ill success in other countries have given good results in Alaska, while, on the other hand, approved hydraulic and mechanical methods, which have given most satisfactory results elsewhere, have in this field afforded unsatisfactory results. Operations, of course, are rendered difficult by the shortness of the season which lasts only from June to the end of September, the lack of grade to the streams, inadequate water and timber supply, high cost of labour and transportation, concentration of gold on and in the bed-rock, the



relatively extreme thickness of barren overburden, and the frozen or half frozen condition of the gravel.

Mr. Purington obtained from his inspection of the placer gold fields of the North the following main impressions:—(1) Operations requiring the installation of expensive plants are frequently undertaken before adequate sampling of the ground has been done. (2) The methods of mining and conveying the auriferous material, while often leaving much to be desired from the standpoint of economy, are, in the main, developing along favourable lines. (3) The gold-washing and gold-saving appliances are inexcusably crude and inefficient. Speaking of the outlook for the future, it is suggested that the interior province of Alaska (and geologically considered, the Canadian deposits of the Klondike come under this heading) promises to continue for many years to be a fairly important productive area. It is, however, pointed out that the natural conditions prevailing in the Alaska Interior gold field are that, alluvial gold is almost entirely lacking where timber and water are plentiful, grades are steep and the ground unfrozen; while where gold is distributed in paying quantities, as a rule, the water supply is inadequate and the timber is poor or altogether lacking; thus, in California and Australia the geologic and topographic conditions favour the placer miner; in Alaska and the Yukon territory they are inimical to his success. Under the head of "Costs of Mining" the following table is given, showing the average capacity and cost of gold gravel mining operations in Northwest America, but it is noted in this regard that the high duty of the miner's inch in the Klondike is a large factor in bringing down the cost of No. 1 and No. 16. Dredg-

ing estimates place the cost at eighty cents per cubic yard, where gravel must be thawed by points ahead of the dredge, but, of course, in certain districts costs are less than twenty cents per cubic yard. It is interesting to learn that frozen ground cannot be attacked with success by the steam shovel, for even where it digs the gravel successfully, if men follow it to clean bed-rock by hand, the cost of operating is sometimes doubled. Mr. Purington, however, believes that the steam shovel has a field in northern placer mining, but, regarding the mechanical operations in general, the important principle should be emphasized that the main expense is getting the material into the receptacle which conveys it to the sluice or washing pan, and that tramping even for a long distance, and to a considerable elevation, adds a very small proportionate amount to the cost of working.

Regarding the cost of prospecting in the Atlin district tunnels timbered and lagged are estimated at \$3.50 per foot at the McKee Creek. On Spruce Creek the cost of posts and caps 10 inches thick and 6 feet long, is fifty cents each, and lagging ten cents each. On Gold Run 36-inch holes are said to have been drilled to a depth of thirty-two feet by a churn drill, at the rate of \$1.00 per foot. In the Klondike drifts to prospect the bench gravels cost \$7.00 to \$8.00 a foot, timbered, and shafts from \$5.00 to \$10.00 a foot. In timbering, three sets of posts, sill, cap and lagging are put in for \$6.00, and as one half cord of wood is used to set, the whole cost is \$7.00 per set. In frozen creek ground two men, working three shifts, sunk a pit five feet square, twenty-eight feet deep, using about two H.P. steam during thirty hours.

TABLE I—Average capacity and cost of gold-gravel mining operations in northwestern America <sup>a</sup>

|                                         | 1.                              | 2.                                        | 3.                                                                               | 4.                        | 5.                                                             | 6.                                                          | 7.                                                                                         | 8.                                                           | 9.                                                              | 10.                                                                | 11.       | 12.                                                          | 13.                                                                 | 14.                                           | 15.                                                | 16.                                 | 17.                                   |
|-----------------------------------------|---------------------------------|-------------------------------------------|----------------------------------------------------------------------------------|---------------------------|----------------------------------------------------------------|-------------------------------------------------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------|-----------|--------------------------------------------------------------|---------------------------------------------------------------------|-----------------------------------------------|----------------------------------------------------|-------------------------------------|---------------------------------------|
|                                         | Hydraulic, no pumping of water. | Hydraulic with use of hydraulic elevator. | Open cut; shoveling into sluice boxes, including stripping top dirt; no pumping. | Open cut; horse scraping. | Open cut; shoveling; wheeling to bucket; cable tram to sluice. | Open cut; shoveling into cars; track and incline to sluice. | Open cut; shoveling into buckets or skips; skidding or tramping, and derricking to sluice. | Open cut; shoveling into sluice; tailings by hydraulic lift. | Open cut; steam-shovel excavating; track and incline to sluice. | Open cut; steam scraping; generally on stripping work or tailings. | Dredging. | Drifting partly frozen or thawed ground requiring timbering. | Drifting and thawing solidly frozen ground; little or no timbering. | Winter drifting and spring sluicing of dumps. | Mining or stripping overburden by ground sluicing. | Hydraulic by means of pumped water. | Booming with self-dumping water gate. |
| <b>SOUTH COAST PROVINCE</b>             |                                 |                                           |                                                                                  |                           |                                                                |                                                             |                                                                                            |                                                              |                                                                 |                                                                    |           |                                                              |                                                                     |                                               |                                                    |                                     |                                       |
| Number of operations considered.....    | 6                               | 6                                         | 6                                                                                |                           |                                                                |                                                             |                                                                                            |                                                              |                                                                 |                                                                    |           |                                                              |                                                                     |                                               |                                                    |                                     |                                       |
| Capacity, cubic yards, in 24 hours..... | 833                             | 350                                       | 54                                                                               |                           |                                                                |                                                             |                                                                                            |                                                              |                                                                 |                                                                    |           |                                                              |                                                                     |                                               |                                                    |                                     |                                       |
| Thickness of deposit, feet.....         | 30.3                            | 25                                        | 5.6                                                                              |                           |                                                                |                                                             |                                                                                            |                                                              |                                                                 |                                                                    |           |                                                              |                                                                     |                                               |                                                    |                                     |                                       |
| Thickness of gravel worked, feet.....   | 30.3                            | 25                                        | 3.7                                                                              |                           |                                                                |                                                             |                                                                                            |                                                              |                                                                 |                                                                    |           |                                                              |                                                                     |                                               |                                                    |                                     |                                       |
| Cost <sup>b</sup> .....                 | \$0.20                          | \$0.31                                    | \$2.01                                                                           |                           |                                                                |                                                             |                                                                                            |                                                              |                                                                 |                                                                    |           |                                                              |                                                                     |                                               |                                                    |                                     |                                       |
| <b>INTERIOR PROVINCE</b>                |                                 |                                           |                                                                                  |                           |                                                                |                                                             |                                                                                            |                                                              |                                                                 |                                                                    |           |                                                              |                                                                     |                                               |                                                    |                                     |                                       |
| Number of operations considered.....    | 13                              |                                           | 20                                                                               |                           | 8                                                              |                                                             |                                                                                            |                                                              |                                                                 |                                                                    | 6         |                                                              | 7                                                                   |                                               |                                                    | 4                                   |                                       |
| Capacity, cubic yards, in 24 hours..... | 1,049                           |                                           | 63                                                                               | 105                       | 162                                                            | 450                                                         | 233                                                                                        | 184                                                          | 800                                                             | 92                                                                 | 1,062     | 50                                                           | 75                                                                  | 50                                            | 150                                                | 830                                 | 250                                   |
| Thickness of deposit, feet.....         | 37.4                            |                                           | 8.6                                                                              | 20                        | 17.5                                                           | 14                                                          | 15                                                                                         | 8                                                            | 22                                                              | 15                                                                 | 35        | 26.4                                                         | 26.4                                                                | 26.4                                          | 9                                                  | 33                                  | 7.5                                   |
| Thickness of gravel worked, feet.....   | 37.4                            |                                           | 3.5                                                                              | 10                        | 4.5                                                            | 5                                                           | 9                                                                                          | 6                                                            | 22                                                              | 8.7                                                                | 35        | 4.36                                                         | 4.36                                                                | 4.36                                          | 4.9                                                | 33                                  | 6.6                                   |
| Cost <sup>b</sup> .....                 | \$0.238                         |                                           | \$2.39                                                                           | \$0.60                    | \$2.14                                                         | \$2.43                                                      | \$1.75                                                                                     | \$1.25                                                       | \$1.46                                                          | \$0.49                                                             | \$0.49    | \$4.25                                                       | \$3.38                                                              | \$5.14                                        | \$0.17                                             | \$0.65                              | \$0.07                                |
| <b>SEWARD PENINSULA PROVINCE</b>        |                                 |                                           |                                                                                  |                           |                                                                |                                                             |                                                                                            |                                                              |                                                                 |                                                                    |           |                                                              |                                                                     |                                               |                                                    |                                     |                                       |
| Number of operations considered.....    |                                 | 4                                         | 10                                                                               | 5                         |                                                                |                                                             |                                                                                            |                                                              |                                                                 |                                                                    |           |                                                              |                                                                     |                                               |                                                    | 3                                   |                                       |
| Capacity, cubic yards, in 24 hours..... |                                 | 658                                       | 145                                                                              | 200                       |                                                                |                                                             | 550                                                                                        |                                                              | 1,000                                                           |                                                                    | 700       | 80                                                           | 20                                                                  | 83                                            | 173                                                | 250                                 |                                       |
| Thickness of deposit, feet.....         |                                 | 12                                        | 6.6                                                                              | 5                         |                                                                |                                                             | 15                                                                                         |                                                              | 30                                                              |                                                                    | 8         | 20                                                           | 35                                                                  | 85                                            | 4                                                  | 23                                  |                                       |
| Thickness of gravel worked, feet.....   |                                 | 12                                        | 3.3                                                                              | 5                         |                                                                |                                                             | 11                                                                                         |                                                              | 27                                                              |                                                                    | 8         | 7                                                            | 4                                                                   | 4.3                                           | 4.4                                                | 23                                  |                                       |
| Cost <sup>b</sup> .....                 |                                 | \$0.89                                    | \$1.87                                                                           | \$0.46                    |                                                                |                                                             | \$0.91                                                                                     |                                                              | \$0.52                                                          |                                                                    | \$0.43    | \$4.49                                                       | 3.66                                                                | \$4.61                                        | \$0.10                                             | \$0.93                              |                                       |

<sup>a</sup> Lost time, the prices paid for mining property, and the cost of equipment other than that relating to actual mining (e. g., railways, wagon roads, etc.) are not taken into account, and any estimates based on these figures must make due allowance for these expenses; otherwise the costs here given will be found too low.

<sup>b</sup> Dollars per cubic yard.

<sup>c</sup> "Muck" and top gravel.

<sup>d</sup> "Muck" or fine silt and ice; from 50 per cent to 75 per cent ice.



Mr. Purington states that reports from many parts of Alaska indicate that the amount of gold obtained per cubic yard from prospect shafts does not equal that extracted by subsequent actual mining. The reverse is very rarely true. It is difficult to assign a reason for this discrepancy other than that, owing to the frozen condition of the gravel, some of the gold escapes when small lots are washed in the winter. Frozen gravel does not easily disintegrate, even in hot water, and unless the residue from panning or rocking is saved and rewashed, losses very likely occur.

It is needless to urge the importance of prospecting ground in a thorough manner before expensive machinery is installed. The many failures through the long history of mining which have resulted from precipitate expenditure to exploit supposed valuable properties present an open page of admonition to him who cares to read.

Again the sampling of winter dumps as they are extracted does not appear to have received the attention which it deserves. A method used by Mr. Kelley, of Dominion Creek, in the Klondike, is as follows:—

The ordinary conical dump of frozen gravel assumes a somewhat steeper angle than that of loose material. One measured in the Klondike had a slope of forty degrees. From experience it has been found that if the ground is of uniform richness, eighty per cent. of the values are contained in the upper two-thirds of the dump, which has a contents of approximately 8,000 cubic yards. The apex of the dumps is generally thirty to forty feet above the base. Four times each day five pans are taken in sampling—one from each quadrant of the dump one-half way down from the top—and one pan from the apex. The results of the two pannings are put together before weighing, and fifty per cent. of the result is taken for the average value of what has been taken out during the day. Neglect to apply some form of sampling to the dumps has caused many lamentable failures in the Klondike.

One of the most interesting chapters in the report discusses the various methods of mining by which gravel is taken out of open cuts. Conditions throughout many of the northern placer districts favour the cheap and simple method of shovelling into sluice boxes, for in many localities the pay streaks are thin, ranging from two to four feet in thickness. When the double depth to the bottom of the pay streak does not exceed twelve feet, the overlying barren material can generally be ground-slucied off, even where the grade does not exceed one per cent. as an expense varying from twenty cents per cubic yard. Dams are generally constructed of sod walls, lined with sacks, which have been found cheaper in the Klondike than those built of sod and bush. On Hunker Creek, in the Klondike, a dam of moss, brush and gravel ninety feet long and eighteen feet high, built for the purpose of keeping the water from an open cut, cost \$500.00. Referring to the bed-rock drains, it is suggested that the ground should be cut in terraces, so that when it commences to thaw it will not run and clog the

canal. Pumping seepage water from the pit is to be condemned in general as strongly as pumping water for sluicing. In Bonanza Creek, Klondike, an operation involving the handling of several thousand yards was said to be more expensive by forty cents per cubic yard when pumping of the seepage was done than when the water was handled by drain. The pumping of seepage water by any form of pump may be estimated to add at least twenty-five cents per cubic yard to the expenses of handling the gravel. The use of overshot wheels operating China pumps is cheap where water is plentiful. A small plant, using twenty inches of water, to lift about one-third this quantity a height of ten feet, with a five feet wheel, costs in the Klondike \$100 to build. The duty of a man shovelling is variously estimated in different districts of the north, but this form of mining has been very nearly discontinued in the Klondike region.

Conditions in the Klondike appear to have necessitated the adoption of the expensive method of placer mining by heavy dumping carriers. The method is adopted to work rich gravels where conditions do not permit of working by ordinary shallow open-cut methods, and where drifting is impossible or inadvisable. The average depth from eight Klondike operations, namely, 17.5 feet, is greater than that economically advisable (namely, 15 feet) for open-cut operations in general. The operator adopts this method because there are thawed streaks and channels in his deposit. If such ground is drifted, the chances are that he will increase his expense to a prohibitive amount through excessive timbering and through pumping of seepage water, whereas by the open-cut method the water is handled by drain. The cost sheets shows that whereas \$2.14 is the average cost of the above-mentioned eight operations in the Klondike, seven drifting operations in similar deposits, with an average depth 25.3 feet, gave an average cost of \$1.95 per cubic yard, the depth of the pay or thickness of gravel actually sent to the sluice being almost exactly the same in both cases, and the capacity in the drifting being only 17.5 cubic yards less in twenty-four hours. Granting, however, that in a given deposit carrying three dollars to the cubic yard of pay, the depth being sixteen feet, drifting is impossible, and the rich pay, seventy-five feet in width, must be worked by open cut. Whatever method be adopted the moss must first be ploughed up and about six feet of muck ground sluiced off at a cost of seventeen cents per cubic yard. Next six feet of barren gravel or sand must be removed, either by horse scrapers at sixty cents per cubic yard, or, if the plant warrants the operation, by steam scraper at forty-nine cents per cubic yard. The four feet of pay being laid bare, what method shall be adopted to get into the sluices? On account of the necessarily short life of the operations, a plant whose first cost exceeds \$5,000 is out of the question. The greatest expense will then result from the hand shovelling in the pit. The getting of the material into the receptacle in which it is conveyed to the sluice is the principal item of expense in the opera-



tion. It is, therefore, necessary that the high-priced shovellers get as much gravel into rows or buckets as possible. The bucket, 37 inches square on top, 35 inches square on bottom, and 25 inches deep, holding two-thirds of a cubic yard, is dropped into a crib built in the bottom of the pit, to which the shovellers wheel their dirt in wheelbarrows. From four to six wheelbarrows are necessary to fill the bucket. There is no mobility to the bucket; it must always rise and fall to the same spot. Men instead of occupying all their time in shovelling are employed nearly half of it in wheeling and dumping. Five operations are necessary to get the gravel from the bank to the sluice, namely, (1) shovelling into wheelbarrows, (2) wheeling to bucket, (3) dumping to bucket, (4) raising bucket to carrier, (5) conveying and dumping to sluice.

The cost of steam shovel operations in Alaska is not evident from the cost sheet printed above, as the figures there given cover the sluicing, often with purchased water, stripping, amortization, etc. With a plant operating at Anvil Creek the actual working cost of digging the gravel, tramping and hoisting, and tripping the cars to the sluice box, including also superintendent's labour, crude oil fuel at \$3.00 a barrel, lubricants, etc., is estimated as follows:—

Cost of steam-shovel work at Anvil Creek, per cubic yard:

|                                                                       |         |
|-----------------------------------------------------------------------|---------|
| Digging . . . . .                                                     | \$0.045 |
| Tramming to incline . . . . .                                         | .025    |
| Hoisting . . . . .                                                    | .018    |
| Dumping . . . . .                                                     | .011    |
| Proportionate superintendence on ground,<br>and incidentals . . . . . | .021    |
| Cost per cubic yard . . . . .                                         | .120    |

But this does not take into account the labour of shovellers, cleaning bed-rock after the shovel. The steam shovel plant at the junction of Bear Creek and Klondike River occupies the flood plain of the latter stream, a fact that influences greatly the economical excavation and disposal of material. This shovel digs in a pit twenty feet below the surface of the flat. The machine weighs thirty-five tons and has a capacity of 1,000 yards in ten hours, but cost of operating are not given.

Drift mining is carried on to some extent in the Yukon, the mines being opened up by main tunnels or runways 6 x 6 feet, which generally require timbering with logs 8 x 8 inches and 6 feet long, the sets having 5 feet centres. The cost of driving a tunnel 5 1-2 feet high, including steam thawing, excavating, tramming, timbering and laying tracks of twelve pound rails was \$6.25 per foot on Solomon Hill in the Klondike.

Drifting operations in the creek deposits of the Klondike, Birch Creek, Forty Mile, and Fairbanks districts of the interior are yearly always carried on in solidly and perpetually frozen ground. A necessary accompaniment of the work is the thawing of the ground by artificial means. Mr. Greenleaf W.

Pichard has thoroughly investigated for this report the possibilities of using any form of the electric furnace for thawing the frozen gravel, and has reached the conclusion that electric thawing is impracticable.

Artificial power, through the agency of the steam point, is only in rare cases applied in open-cut work. The Klondike district affords a few examples of this application of power, notably in connection with dredging operations on Bonanza Creek, the steam-shovel operations on Bear Creek, and in two open cuts on Upper Dominion and Hunter creeks. It is difficult to determine the efficiency in open work, as, naturally, a portion of the thawing is done by the sun. From the data collected, however, by Mr. Purington, it does not appear to be any greater than its underground efficiency. But it is stated that the method of thawing gravel under ground by wood fires is expensive, and, except under special conditions, is not practiced in districts where transportation facilities permit the bringing in of boilers. Referring to the future of hydraulic mining in the Klondike, Bird's Creek, Forty Mile, Eagle and Tamana, Mr. Purington expresses the opinion that the outlook is not promising. The gentle slopes of the mountain, the low grade of the creek valleys, and the insufficient quantity of water are, in themselves, unfavourable factors. Where hydraulicing is possible in the Klondike the gold-saving appliances are generally adequate to the needs of the operations.

One of the most interesting chapters in the report is devoted to dredging, and the writer remarks that, notwithstanding the difficulties encountered in the northern fields, the possibility of successful dredging under certain favourable conditions is not to be denied. A small dredge for prospecting purposes, operated on the Stewart River, and digging to 30 feet, handled 750 cubic yards in 24 hours, at a cost of seven cents per cubic yard, last year. A dredge of the New Zealand type has been in operation on Bonanza Creek, the ground being thawed by means of 11 feet pieces of gas pipes, twelve in number, driven vertically into the ground. The bed-rock here is a sericite-schist, and the dredge is said to clean it well. The season for operating is from May 15th to Oct. 1st, and it is understood that this dredge was successfully operated during the season of 1904, on ground that had been previously drifted. It is estimated that in the Interior of Alaska the costs of dredging averaged forty-nine cents per cubic yard for unfrozen, and eighty cents for frozen ground.

## QUEBEC'S NEW MINERAL REGION.

By John E. Hardman.

(Concluded from last month.)

The first deposit of economic interest which was investigated was a wide bed, band or "vein" of quartz carrying occasional spots and masses of pyrite and chalcopryite, and frequently showing small particles or "sights" of free gold. This quartz body



is on "Portage Island," a body of land some three miles long (from N.E. to S.W.) by one to two miles wide, and constituted an island by reason of its occurring between the two discharges from Lake Chibogamoo to Lake Doré. The mass of the island is composed of ancient Huronian rocks, penetrated by dikes of diorite and other plutonics. The crystalline schists (chloritic, epidotic and magnesian), are associated with more or less completely metamorphosed eruptives, forcibly recalling the series previously observed to the west of Lake Temiscamingue in Ontario. The sharply angular agglom-



Gras Chute, Chigobiche River.

erates seen in the Temagami district are occasionally observed on this island, but the two prevailing types are altered schists, micaceous and chloritic in character, and an altered or "Saussuritized" gabbro. The island has two peaks or summits, rising to heights of 250 to 300 feet above the level of the lake, and near the summit of one of these peaks a development of clastic rocks was noticed, consisting of agglomerates associated with reddish or brownish felsites.



Paint Mountain, from Mt. Sorcier.

The altered gabbro is, in places, permeated with chalcopryite, which has concentrated itself along certain lines of fracture for short distances, and has led to the hope that a workable body of copper ore will be found. The chalcopryite itself is auriferous (samples yielding from \$2.40 to \$18 per ton), and unusually good in copper, several assays of 26 per cent. to 28 per cent. having been made. Some work had been done on one of these copper bearing frac-

tures in the belief that it was a bed or vein, and the rock was so unfamiliar to me that an unaltered specimen was sent to Prof. John A. Dresser of Montreal, for microscopic determination. Prof. Dresser has described it as composed (essentially) of zoisite, chlorite, and mica, the zoisite being the prevailing constituent, and derived from the alteration of Plagioclase; the mica and chlorite coming from alteration of other bisilicates, chiefly (probably) Pyroxene. "In its original composition," writes Prof. Dresser, "it would have been a gabbro but it has been very completely metamorphosed. The rock is coarse in texture, and greyish-green in color, with numerous dirty white spots (zoisite) distributed through the mass. It has, probably, been formed by a very slow cooling under great pressure. Its similarity to certain of the marginal rocks of the Eastern Townships belt (P.Q.) would predispose an investigator to the hope of finding both copper and lead ores; the copper has already been observed by the writer, and Indians report (in this district) a mineral which, from the description given, should be galena.



Cut A, across Gold Deposit, 42 feet in width.

The altered schists have quartz veins, large and small, cutting obliquely and also running parallel, or intercalated. Most of these quartz veins are sparsely mineralized, the prevailing species being pyrite, but in one large deposit the pyrite and chalcopryite seem to be in equivalent proportions. This big quartz vein shows, occasionally, very considerable particles of gold, and, usually, minute colors when crushed and panned.

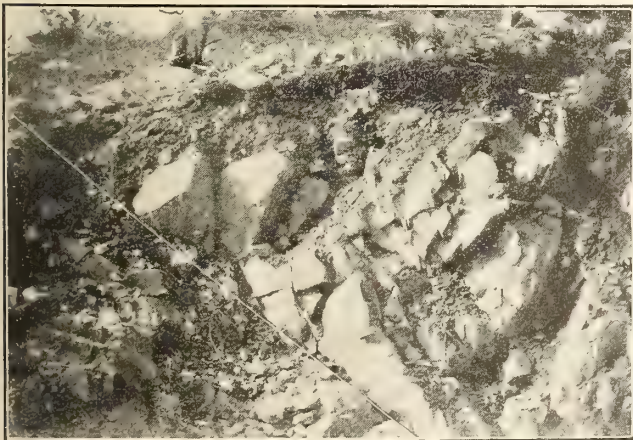


The determination of probable economic gold values in this vein was one of the chief reasons for my visit.

A cross-section of the island by a north-west and south-east line running through Bouleau Point, shows flat, swampy land for about one quarter of a mile, followed by a bench of approximately 30 feet in height and only 200 or 300 feet wide, which in turn is succeeded by a regular and approximately uniform slope rising to the base of the two peaks mentioned. About the middle of this slope the big quartz vein was first discovered through its outcrop having been denuded of all soil by the steepness of the slope. Its course (magnetic) is N. 83 W., and the line of strike follows down the hill and quickly reaches the bench already mentioned. Striping on this bench is a matter of time and hard labor, as the cover is from 8 to 10 feet in depth, of which the first 3 or 4 feet is a mass of interlaced roots and large boulders.

The dip of the deposit is to the north-north-west, and near the surface the dip angle varies from 70 deg. to 75 deg. The footwall is altered schist and in two of the cross trenches the hanging wall appeared to be diorite or diabase but in another cross trench the hanging was the same schist that constituted the footwall. The approximate value of the quartz, so far as exposed, was determined from a large number of samples to range from \$8.00 to \$10.00 in gold per ton. The free gold present (average of 36 pan tests) amounted to \$3.00 per ton. When concentrated the metallic sulphurets gave a fire assay value of about \$70.00.

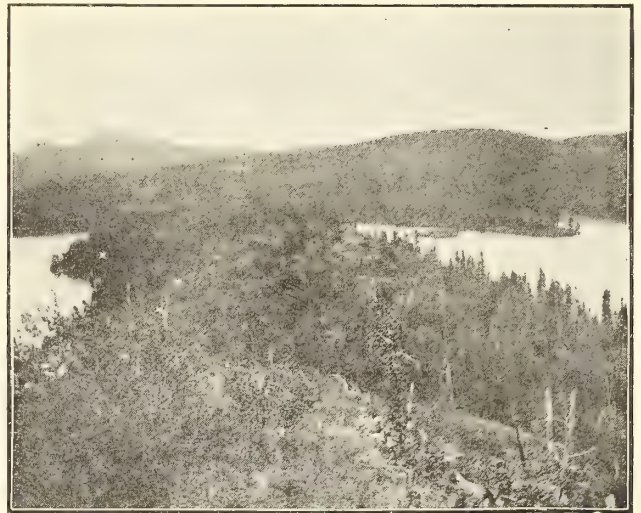
The gold values in this quartz deposit are not uniformly distributed, but follow the variations usual in all deposits of which I have knowledge. Yet the unusually high average of \$3.00 (in free gold), in a deposit of such large dimensions holds out an alluring promise of satisfactory realizations when transportation conditions permit its economical working.



Cut B, Showing Footwall of Big Quartz Deposit.

The smaller veins of quartz which (as observed) had widths ranging from 6 inches to 4 feet, also contained more or less gold; assays ranging from \$1.40 to \$11.00 per ton. There are many controlling conditions (of transportation, labor and climate),

which require to be determined before economic results can safely be prophesied, but the showing is of such a character that if food could be provided there is little doubt but that the prospector would soon be ubiquitous in the land. On the north side of Paint Mountain (which is the most easterly peak of the two already mentioned) occur strata very highly impregnated with pyrite (distinct lenses being sometimes visible) which also carry varying amounts of chalcopyrite. The decomposition of the sulphur mineral to the various oxyhydrates of iron, has streaked this side of the mountain with tints of yellow and red ochre and to this fact the peak owes its name. The pyrite is plentiful, but at such a distance from transportation possesses no economic value.



Asbestos Island, looking Westerly along the Ridge. Crosses (x) show location of Pits No. 5, No. 6 and No. 4.

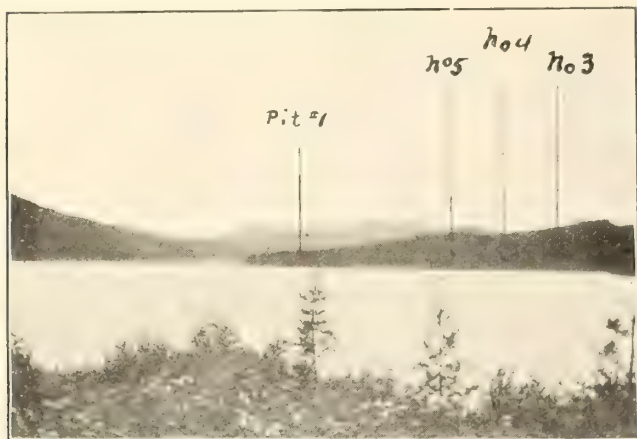
Traversing the shoreline northerly from Portage Island towards McKenzie Bay the persistence of altered members of the Huronian is everywhere noted. Near the narrows leading to McKenzie Bay an intrusive granite is noticed which is succeeded by a conglomerate of rounded pebbles for about one mile. On the eastern end (or side) of McKenzie Bay, the schistose character of Portage Island is duplicated, even to the intrusion of dykes of diorite and diabase, but along the northern and western shores there is a development of Pyroxene and magnesian rocks which somewhat prepares one for what has been found on Asbestos Island.

Asbestos Island has a length of between three-quarter and seven-eighths of a mile in an east and west direction, with a width of one-eighth to one-quarter of a mile. It rises in the centre, to a height of about 150 feet above the lake, and is composed of serpentinous rocks with some schists, chiefly hornblende. On the western end the color of the serpentine is black, due to an oxide of iron which also is probably the cause of its weathering to a black sand which suggests chrome iron ore. As a matter of fact the presence of chrome iron in the rock was reported to me, but none of my tests revealed its presence. At the eastern end of the island the hornblend schists are more noticeable



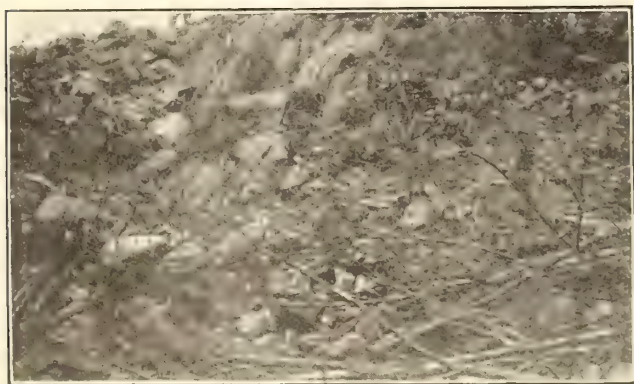
than at the west; they carry occasional fibrous pieces which have the appearance of amphibole, or true asbestos, but no particular attention was paid in view of the dark color, also in view of the splendid deposits of chrysotile (or Canadian asbestos) which occur in the middle and western portions of the island.

This island is the property of the Chibogamoo Mining Co., Ltd., which has been organized by Mr. McKenzie as the holding company of his numerous locations. Six different pits have been opened on the island, of which five show remarkably good



Asbestos Island from the South.

quarries of chrysotile, the chief asbestos of commerce. The length of fibre shown in the various seams varies from 3-4 of an inch to 5 1-2 inches. The quality of the fibre obtained is very fine, threads of an exceeding slenderness showing remarkable strength. The color in the rock is light or pale sea green, which turns to a snow white when crushed out. The percentage of water contained was quite uniform at 14.5 per cent. to 15 per cent.



Asbestos Pit No. 3.

The containing rock is a very fine-grained, compact, light to dark green serpentine, breaking with a slight curved or conchoidal fracture. Near the top of the high land in the centre of the island this serpentine is seamed, in one or two places, by narrow bands or dykes (1 inch to 1 1-2 inches wide) of what I first took to be a siliceous dolomite, but which, on return to urban life, was proved to be an aluminate of lime and magnesia, probably a variety of nephrite. In the neighbourhood of these veinlets

the fibre was harsher and coarser than that occurring away from them.



Asbestos Pit No. 5, where 5½-inch fibre is abundant.

On the eastern side of Chibogamoo Lake there are small seams up to 4 inches wide, of magnetite, on the slope of Mount Sorcier, which rises to a height of 500 feet above the water, but no commercial deposit of iron ore had at that time been discovered.



Camp on Ashuapmouchouan Lake, Old Hudson Bay Post.

From Lake Wahnkonichi, on the east side, came specimens of pyrrhotite, which was nickeliferous, and on Rush Lake (according to the Indians) occurs the galena which is supposed to be argentiferous. The country is unknown, except perhaps to Commander A. P. Low of the Geological Survey, who made a traverse about 1885. That gentleman is again in this field this summer, and in conversation told me he intended to pay particular attention to the belt of green stones which has been mapped as occupying the valley of the Chibogamoo River, and extends beyond the river in a west-south-west course. This band of "greenstones" (so called generically as embracing diorites, diabase, gabbros and the volcanics generally) lies, approximately, in the middle of the wide Huronian belt which forms the northern boundary of that extensive range of Laurentian rocks, known to the rail-



way maps and to tourists as "The Laurentides." The injection of these eruptives through the mass of the Huronian has, broadly speaking, occasioned



Party on return trip resting on rocky islet in Lake Chibogamoo.

islands of igneous rock in a sea of older rocks, and on the edges of these contracts metalliferous deposits may be confidently expected.

### THE IRON ORES OF NOVA SCOTIA.\*

(Torbrook and Nictaux.)

Judge Haliburton in 1829 wrote that iron ore had long been known to exist in Annapolis county in great abundance and that efforts had been made to manufacture it at Nictaux. In the year 1825 the Annapolis Iron Mining Company was incorporated to manufacture hollow ware and bar iron. The company purchased a valuable and extensive bed of ore situated about three miles and a half from the mouth of the Moose River, another of equal importance at Nictaux, with one or two beds in other places. They selected the eastern bank of the mouth of Moose River as the site of their buildings, erected a large smelting furnace, stock house, coal house, stores, etc., manufactured a quantity of hollow ware of very superior quality, and laid the foundation of forges for making bar iron. The quality of the ore was regarded as fully ascertained, and the only part of the experiment to be decided was whether they could compete with the English ware, or whether the cost of manufacture would not exceed the value of the article when manufactured, a result depending upon the economy and skill with which the establishment was managed.

In a paper on the Mineralogy and Geology of Nova Scotia, presented to the American Journal of Science in 1828 and 1831 by Jackson and Alger, mention is made of this ore bed seen on Nictaux Mountain. The width of the ore at the surface is said to be six feet and a few inches; increasing, apparently, as it deepens, it gives promise of an immense supply of this valuable mineral. It is covered by a stratum of ferruginous soil about two feet thick, on removing which the surface of the ore bed, being in some places quite smooth as if worn down by attrition, is seen curiously intersected by seams,

\*Abstract from Summary Report of Geological Survey of Canada. (Ottawa, 1905).

some of which cross it transversely or nearly at right angles, and, when in open fissures, are filled up with a substance not unlike red ochre. They give the ore a tendency to separate into rhomboidal fragments, similar to those into which the slate itself often divides, and greatly facilitate the labour of raising it. The bed had been opened to a depth of eight or ten feet, and some hundred tons of the ore had been removed to the smelting furnace situated on the southern shore of Annapolis basin.

The character of the ore at this place differs in some respects from that of the Pictou county ore. From its very uniform slaty structure it is more easily broken up, and it abounds to a much greater extent with the casts of marine shells, the calcareous parts of which are sometimes still preserved.

Dikes and masses of granite and porphyry are described as intercepting the strata of slate and the ore bed accompanying it, but it appears again in the vicinity of Clements, a distance of thirty miles, the last place along the range of the South Mountain where it is known to appear.

Dr. Abraham Gesner, in 1836, in his *Geology and Minealogy of Nova Scotia*, states that the smelting furnace had at that time discontinued operations from causes not generally known, although the ore was said to yield about fifty per cent. of good cast iron.

He also adds that the bed of iron ore at Nictaux is about six feet and a half wide and being divided into cubical masses and, therefore, easily broken up, will afford an immense quantity of metal at less expense than it can be procured at many other places. It has but a shallow covering of soil, a large proportion of which is the carbonate of iron. The walls of slate are distinctly separated from the metallic compound, and are not so much intermixed with the iron as those forming the sides of the bed at Clements. The ore, though very similar, is of a superior quality, and offers every inducement for working. At that time, excellent iron, manufactured at a smelting furnace and foundry erected near Clements, several years before was in use in Cornwallis. The ore, like that at Clements abounds in marine organic remains, and the impressions they have made in the ore and slate are extremely beautiful and distinct. It is argued that because the shells at Nictaux are as abundant in the iron ore as in the slate they are of contemporaneous origin.

About a mile and a half north-west from the spot where the ore has been exposed, the Nictaux falls come foaming down a narrow and tortuous channel worn out of the strata of slate. Were an iron foundry erected at the falls, it is improbable that it would be unprofitable. Only a mile and a half from the ore, the rapid river, would supply a power more than sufficient for any machinery that might be required under the most extensive operations, and Dr. Gesner does not hesitate to declare that the mining and smelting of iron ore at Clements and Nictaux may be as profitably conducted as in any other part of the world.

In the *Industrial Resources of Nova Scotia*, he deplores, in 1849, the failure of an association form-



ed for the smelting, casting and manufacture of iron near Clements, although both the ore and the iron produced from it proved to be unexceptionable; he adds: "Another band of iron ore occurs in the Silurian rocks of Nictaux, which, like those of Clements, abound in the fossil shells and corals peculiar to the group. The ore at this place is six feet four inches in thickness and the outcrop is seen on the surface to the distance of half a mile. The Falls of the Nictaux River offer an admirable site for machinery, and the forests through which the stream passes would maintain a furnace for a long period of time. Excellent iron was manufactured at this place in the early settlement of the country. Silurian fossils are found at New Canaan, southward of Kentville; and the ochres that usually accompany the iron were made into pigments at that village a few years since." Dr. Gesner also foresaw that after the forests had disappeared the coal mines would offer a cheap supply of fuel; and he pointed out that the iron ores of Great Britain did not yield on an average more than thirty-five per cent. of cast metal and that many of them are taken from the clay ironstone beds of the coal fields, scarcely exceeding a foot in thickness, and from great depths; that, moreover, the iron mines of Annapolis are on lands embraced by the old grants in which the coal, iron and other minerals were not reserved to the Crown.

The excellent quality of the ore thus highly spoken of so many years ago was corroborated by subsequent observers, and it was shipped for many years to mix with the iron ore of Londonderry, to which, however, it is said by Dr. How to be inferior.

This interesting mining district is situated among blooming orchards, cultivated fields and green meadows, is intersected by roads, and is close to two railways and in the vicinity of two large water powers.

When the Nictaux works were in operation, limestone was imported from New Brunswick to a port on the Bay of Fundy and thence conveyed by land carriage some eleven miles to the furnace. Several thousand tons of iron ore were mined, chiefly from the bed of shell ore.

Sir William Dawson describes the Nictaux ore as a bed of highly fossiliferous peroxide of iron, from three to four and one-half feet in thickness, the outcrop of which appears at several places in Nictaux and at Moose River at a very high angle beneath Triassic, red, coarse sandstone and extending from Canaan and Kentville, in Kings' County, to Bear River in Digby County, a distance of seventy miles, but separated into two parts by granite. At Nictaux the ore is a peroxide of iron, containing 55.3 per cent. of iron, laminated in structure, and full of fossil shells. At Moose River it is in the state of magnetic iron, but retains its character in other respects. This ore is thus of great value. Its distance from the coal fields, and the consequent necessity of smelting with charcoal, have been obstacles in the way of its commercial application.

The Nictaux mines had been worked for many years and extensive works had, at great expense,

been erected for smelting the ore. In 1855 a company of English capitalists continued operations on the ores of the shell bed, and in 1858 exported 744 tons of iron valued at \$2,375, and in 1859, 1,125 tons valued at \$14,790. One shaft was opened close by the furnace, another about two miles to the eastward. The main supply of limestone came from St. John to Port George, ten miles away on the Bay shore. The pig iron had to be hauled to the same place for shipment. Charcoal was used instead of coal. These methods of operation proved so costly that these works, also, had to be closed.

About 1870 Messrs. Stearns and Page, the promoters of the railway from Middleton to Bridgewater, turned their attention to the magnetic ores of Cleveland on the west side of Nictaux River, from which a bed about eight feet thick was followed at intervals as far as Lawrencetown, six miles west of the river, where the strata are finally cut off by the granite.

They took out leases of an extensive territory, intending to re-open the mines on the completion of their railway, which was projected to run along the deep valley of the Nictaux River, and by facilitating transportation would remove one of the chief obstacles to the success of the earlier blast furnaces. But their first plans miscarried, and it was not until many years later that the Nictaux and Atlantic was formally opened as the Nova Scotia Central Railway, which is now called the Halifax and Southwestern.

In the autumn of 1890, R. G. Leckie, manager of the Londonderry Iron Company, revived the interest in mining in this district by securing a bed of excellent red hematite at Torbrook, about three and a half miles east of the Cleveland mines, and in the spring of 1891 a steam hoisting plant was erected, shafts opened and a railway laid to Wilmot, three miles distant, to join the Windsor and Annapolis, now the Dominion Atlantic Railway. The ore was transported to Londonderry to mix with other ores, and the owner of the land having the right to the iron ore by the terms of the grant made to the original settlers by the British Government, Messrs. Barss and Burns, S. Barteaux and John Banks drew large amounts of royalty.

As enumerated by Mr. R. G. E. Leckie, for some time manager of the mines, in his paper on the iron deposits at Torbrook, the ore beds are four in number. No. 1 is that which has been worked at Torbrook mines, and is locally known as the Leckie bed; its general strike is N. forty degrees E. and its dip, S. forty degrees E. 70 degrees—80 degrees. It has an average thickness of six feet and is perfectly clean, there being no slate or stone between the north and south walls. These walls consist of two feet and eighteen inches respectively of a variegated talcose slate, white, bluish and pink in colour, the white and bluish slate predominating, interstratified among dark blue slates spotted with red iron stains.

It is noticeable that this bed of ore is entirely free from shells, while the overlying No. 2 bed, between sixty and a hundred feet south, and several



beds of the surrounding slate are highly fossiliferous.

No. 2 or the shell-ore bed, as it is called, is that which was worked by open cut for many years to supply the old furnace at Nictaux Falls. It is, perhaps, identical with the shell bed worked at Moose River, although the connection has not been traced, on account of the disturbed condition of the intervening ground. The ore is a red hematite, metamorphosed at the western end into magnetite by its proximity to the igneous rocks.

The outcrop of No. 3 bed appears halfway up the side of South Mountain about a mile south of No. 2. It is the same in width and structure as No. 1, the only difference being that it is somewhat magnetic in character and has a darker or reddish brown streak. The dip is almost vertical or slightly inclined to the north-west, so that it has reasonably been assumed to be a repetition of No. 1 on the southern outcrop of a syncline, although as yet no bed corresponding to the shell-ore has been found north of it.

No. 4 bed of Mr. Leckie's report has been opened on Messenger's property, almost on the Kings' County line, and following the strike it would be farther up the mountain than No. 3, although the walls are composed of talcose slate like those of No. 1. It was opened and found to be of the following dimensions: Ore 2 feet; Slate 3 feet; Ore 1 foot.

Active operations began, as already stated, in the spring of 1891, when ore was raised from two shafts (called No. 2 and No. 4), one of them worked by back-stoping the ore, while the other was worked underhand. In the autumn two more shafts were opened (No. 3 and No. 5). No. 3 was worked underhand and No. 5 shaft by back-stoping. Four levels were driven in the ore cut by these shafts. The lower levels were still in good ore when the work was discontinued; in the two upper levels going east the ore is said to have been cut off by a small fault.

The output was increased from twenty tons a day in the spring of '91 to seventy tons in the spring of '92, and in the fall to 130 tons.

In 1895 the main shaft was 350 feet deep, and levels had been extended in the ore to a distance of 1,500 feet. The angle of inclination, about eighty degrees at the surface, had flattened to forty-five degrees, and the thickness of the bed of ore had increased from six to twelve feet. After 1896 the mines were closed for some years owing to the suspension of work at Londonderry, and because the Nova Scotia Steel Company drew its supply from Newfoundland; they were not opened again until 1903. When closed down the mine was in good working order with a large amount of valuable ore in sight.

The production of iron ore from the Torbrook mines during these years is estimated as follows: to 1891, 10,000 tons; 1892, 18,000 tons; 1893, 30,000 tons; 1894, 21,590 tons; 1895, 35,073 tons; 1896, 19,944 tons.

After operating for five years, and supplying Londonderry and Ferrona with 135,000 tons, the

Torbrook mines, as already stated, were idle from 1896 to April, 1903, when they were reopened for the Londonderry Mining Company, under the superintendence of W. F. C. Parsons and the management of Mr. H. McI. Weir. The old plant was used after being renovated. The mine was pumped out and ore was raised from the No. 2 or Woodbury shaft. Part of the work was done by contract. Fifty men were employed; in 1903 nearly 5,000 tons of ore were mined, and the present output is about seventy tons a day.

Mr. Parsons states that the ore bed in the present workings varies considerably in size, and in places runs up to twelve feet in thickness, being apparently lenticular in form, the lenses pitching westerly at a low angle.

Recent investigations of the geological structure of the Nictaux and Torbrook basin are given by Professor Bailey in his reports to the Geological Survey.

Vigorous explorations, in charge of Mr. Francis Park, Major James L. Phinney and others, were carried on during the summer of 1900 by Messrs. S. M. Brookfield, of Halifax, George E. Corbitt, of Annapolis, and others, records of which have been obtained for the Geological Survey. A bed, varying in thickness from six to ten feet, was traced westward from the Black River at the contact of the Triassic, near the county line, and passing a short distance south of the Leckie bed is believed to represent the well-known shell bed, the ore running from 33 to 55 per cent. of metallic iron. One of the Government calyx drills was used to bore through the bed at a depth of 300 feet beside the Torbrook road near the Leckie mine. At this depth the ore bed is said to be about nine feet thick. A subsequent boring at Fletcher Wheelock's farm cut three beds of iron ore; and one, No. 5, on the S. McConnell farm, cut two beds on the steep north dip of the syncline, which seem to prove a thickening of both in depth.

Sufficient work was done, according to Mr. W. F. Jennison by a series of bore-holes, test-pits and trenches to show that the ore beds are continuous as above stated, with the exception of small interruptions by faults, one of which on the east side of the Leckie workings, and another west of them, have been proved; and by dikes of diorite and granite which have partly metamorphosed the red hematite into magnetite.

The close proximity of the ores, both in the valley and on the South Mountain, renders concentration of the mines and machinery possible, and reduces the cost to a minimum. With a production of 150 tons a day the cost of mining and shipping ore to Sydney is estimated by Mr. Jennison as follows:—

|                                                  |              |
|--------------------------------------------------|--------------|
| Mining and putting on cars.....per ton           | .75          |
| Haulage by rail to Annapolis, 32 1-2 miles. .... | “ .25        |
| Loading ship at Annapolis .....                  | “ .10        |
| Freight to Sydney .....                          | “ 1.00       |
|                                                  | <hr/> \$2.10 |



Timber for all mining purposes is easily procurable. Mr. Jennison suggests the derivation of power to work the mines from the Nictaux River, which has a length of fourteen miles, is fed by several large lakes, has a fall of seventy feet in a distance of 3,750 feet and a flow during the dry season of 7,680 cubic feet per minute, which would give 500

horse power during the dry time. The cost of installing electrical plant of this power and connecting it with the mines three and a half miles distant he estimates at \$25,000.

The following analyses, collected from different sources stated in the table, will serve to show the character of the Nictaux and Torbrook iron ores:—

ANALYSES of Iron Ores of Nictaux and Torbrook, Annapolis County, N.S.

| Sample No.             | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | 11    | 12    | 13    | 14    | 15    | 16          | 17    |
|------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------------|-------|
| Peroxide of iron .     | 71.85 | 26.39 |       |       |       | 75.80 | 48.34 |       |       |       | 74.63 | 86.74 | 84.29 |       |       |             |       |
| Protoxide of iron.     | 69.17 |       |       |       |       |       | 21.76 |       |       |       |       |       |       |       |       |             |       |
| Protoxide of manganese | 0.28  | 12.74 |       |       |       | 0.65  | 0.40  |       | 0.86  |       |       |       |       |       | 3.02  | Heavy trace |       |
| Alumina                | 3.59  |       |       |       |       | 4.19  | 1.62  |       | 5.53  |       |       |       |       |       | 5.00  |             |       |
| Lime                   | 2.30  |       |       |       |       | 6.30  | 4.01  |       | 2.70  |       |       |       |       |       |       |             |       |
| Magnesia               | 1.00  |       |       |       |       |       | 0.60  |       | 0.41  |       |       |       |       |       |       |             |       |
| Phosphoric acid        | 1.82  |       |       |       |       |       | 3.08  |       |       |       | 3.80  | 0.399 |       | 0.427 |       | 0.414       |       |
| Sulphuric acid         |       |       |       |       |       |       |       |       |       |       |       |       |       |       | 0.57  | 0.196       |       |
| Titanic acid           |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |             |       |
| Insoluble matter       | 18.94 | 18.13 | 33.50 | 11.64 |       | 8.26  | 18.95 | 18.56 | 13.30 | 17.21 | 11.00 | 10.28 | 12.87 |       | 26.50 | 10.12       |       |
| Metallic iron          | 50.09 | 50.27 |       | 59.11 | 53.14 | 53.06 | 50.77 | 52.22 | 55.49 | 57.99 | 52.24 | 60.72 | 59.00 | 61.38 | 47.50 | 55.74       | 56.45 |
| Phosphorus             | 0.05  |       |       | 0.17  | 0.172 | 2.65  |       |       | 0.23  | 0.18  | 1.66  | 0.17  |       | 0.18  |       | 0.18        |       |
| Sulphur                | 0.79  |       |       | 0.09  |       | 0.20  | 0.08  |       | 0.08  | 0.04  |       |       |       |       | 0.23  | 0.08        |       |
| Manganese              |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |             |       |

NICTAUX—1, Geological Survey Report for 1873-74, page 210; 2, Geological Survey Report, Vol. V., Part P., page 179; 3 do, page 180; 4 and 5, Gilpin's N.S. Mines and Mineral Lands, 1880, page 58; 6, "Shell ore," William Smaill in Trans. Min. Soc. of N.S., Vol. I., Part 3, page 62; 7, do, page 59, a magnetite; 8, Average of four magnetites from the Heatly, Baker and McConnell (2 samples) farms at Nictaux and Cleveland, Geological Survey Report, Vol. XIII., Part R., page 29, 1900; 9, Average of three samples of magnetite from Cleveland; 10, Average of two samples of hematite from Cleveland; 9 and 10, from Department of Mines for N. S., page 61, 1875.

TORBROOK.—11 to 17, Geological Survey Report, Vol. V., Part P., pages 179 and 180.

ANALYSES of Iron Ores of Nictaux and Torbrook.—Continued.

| Sample No.             | 18    | 19    | 20    | 21    | 22    | 23    | 24    | 25    | 26    | 27    | 28    | 29    | 30    | 31    | 32    | 33    | 34    |
|------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Peroxide of iron       |       |       |       |       |       | 49.52 |       | 79.42 |       |       |       |       |       |       |       |       |       |
| Protoxide of iron      |       |       |       |       |       | 27.09 |       |       |       |       |       |       |       |       |       |       |       |
| Protoxide of manganese |       |       |       |       |       | 0.80  |       | 0.38  |       |       |       |       |       |       |       |       |       |
| Alumina                |       |       |       | 3.14  |       | 1.90  |       | 5.08  |       |       |       |       |       |       |       |       |       |
| Lime                   |       |       |       | 2.16  | 4.50  | 7.00  |       | 1.90  |       |       |       |       |       |       |       |       |       |
| Magnesia               |       |       |       |       |       | 1.80  |       | 0.35  |       |       |       |       |       |       |       |       |       |
| Phosphoric acid        |       |       |       |       | 0.30  |       |       |       |       |       |       |       |       |       |       |       |       |
| Sulphuric acid         |       |       |       | 0.11  |       |       |       |       |       |       |       |       |       |       |       |       |       |
| Titanic acid           |       |       |       |       |       |       |       |       |       |       | 0.144 |       |       |       |       |       |       |
| Insoluble matter       |       |       | 17.21 | 5.93  | 9.50  | 13.48 | 10.22 | 12.00 | 11.56 | 10.30 | 10.87 | 14.16 | 10.35 | 7.07  | 0.41  |       |       |
| Metallic iron          | 56.00 | 58.05 | 57.93 | 59.86 | 60.00 |       | 59.76 | 55.60 | 54.71 | 42.30 | 54.84 | 53.10 | 55.40 | 54.28 | 52.40 | 50.76 | 54.87 |
| Phosphorus             |       | 0.193 | 0.16  |       | 0.13  | Trace |       | 0.43  | 0.669 | 0.306 | 1.452 | 0.704 | 1.037 | 0.53  | 1.861 |       |       |
| Sulphur                |       |       | 0.036 |       |       | Trace |       | 0.11  | 0.007 | 0.015 | 0.015 | 0.025 | 0.114 | 0.028 | 0.030 |       |       |
| Manganese              |       |       |       |       |       |       |       |       | 0.52  | 0.41  | 0.24  | 0.26  | 0.28  | 0.23  |       |       |       |

TORBROOK—18, Geological Survey Report, Vol. V., Part P. Pages 179 and 180; 19 and 20, Gilpin's Mines and Mineral Lands, 1800, page 58; 21 and 22, Geological Survey Report, Vol. X., Part S., page 98; 23 and 24, R. G. E. Leckie in Trans. Min. Soc. of Nova Scotia, Vol. I., Part 3, page 53; 25, do., page 61; 26 to 32, Ores from the Armstrong and other farms on the South mountain, Report by Dr. E. Gilpin, 1901; 33, average of 10 samples, ranging from 46.60 to 55 per cent of metallic iron, from the Spinney, Martin, H. P. Wheelock, F. Wheelock, Holland and Allen farms; see map also Geological Survey Report, Vol. IX., Part M., page 142; 34, McConnell farm on the southern side; 33 and 34 are also from Gilpin's Report, 1901.



Various estimates, all more or less vague, have been made of the approximate quantity of iron ore in this district. Dr. Gilpin estimates that every thousand feet longitudinal and 500 feet vertical of the northern beds worked out will produce 1,800,000 tons of ore—practically three years' supply at 2,000 tons per day. His estimate to a depth of 800 feet for the district so far developed is not less than 300,000,000 tons.

Consequently, the small extent to which, so far, the ores of Nictaux and Torbrook, those of the East River of Pictou and other localities in Nova Scotia have been used, can only be explained, as suggested by Dr. Poole, by supposing that they are harder to smelt; that they are not so high in metallic iron as foreign ores or that they cost more to mine and deliver at the furnaces.

### PROPOSED AMENDMENTS TO THE ONTARIO MINING LAW.

To the Editor:—

Sir,—I would respectfully submit that the proper policy for the Ontario Government to pursue from the standpoint of those interested in the mining industry would be for the Temiscamingue & Northern Ontario Railway Company to extend its line of railway to Hudson Bay at the earliest possible date, and this line of railway with that of the Grand Trunk Pacific, together with the numerous large rivers emptying into the Hudson Bay would open up an empire of mining lands to the explorer. It would cost some \$10,000,000 to construct the railway and about \$1,500,000 to pay interest on the investment and the expense of operating the line of railway. If the company is to succeed they must adopt the policy that would be pursued by a modern railway company and erect, or secure the erection of, a refinery at some point on their line of railway.

The marvellous wealth of the silver Cobalt district and the promising mineral areas existing both in Northern Ontario and Northern Quebec, and also the attractions of Temagami and other similar attractions. If properly brought to the attention of explorers and capitalists in Great Britain and United States, should bring to Northern Ontario 10,000 explorers and \$50,000,000 of mining capital, and that, with the assistance of the agricultural interests in the Clay Belt, would secure a remunerative traffic for the provincial line of railway for all time to come. The present working conditions are somewhat similar to those imposed under the laws of the United States and British Columbia and are quite ample and satisfactory if owners were compelled to perform such development operation, *or in default have their leases cancelled.* The Temiskaming Mining Regulations should be amended requiring the explorer to commence development operations within ten days after he locates his claim and perform at least twenty days' work during each of the next succeeding three months, except during the winter season, and this would obviate the necessity

of an inspector being called upon to decide whether the licensee has made a valuable discovery or not. The United States courts hold that a valuable discovery is the finding of a vein or lode in place which an experienced miner would consider himself justified in spending his time and money on the location with the reasonable expectation of finding ore in paying quantities, and it is always preferable that a man's title should rest on his own acts than on the discretion of an official, and this is one of the cardinal principles in the United States mining law.

2. The advocates of a royalty on mineral are playing into the hands of the nickle trusts in the strongest possible manner, as they are perfectly confident that even if it became law such a tax would never be enforced; and yet, on the other hand, it is a most powerful ghost to frighten away American capitalists who have not yet invested in Ontario, as they at once come to the conclusion that, if the farmers of Old Ontario are prepared to impose a royalty on the infantile mining industry; that, if the mines did prove of great value and extent that that would be a signal for the imposition of still greater and more unjust taxation on the minority in Northern Ontario, and they come to the conclusion that they will invest their money in the States and other countries where the importance of the mining industry is appreciated by the manufacturers and farmers of such country.

The advocate of the royalty is sowing seeds of discord in Northern Ontario, and if persisted in will eventually mean the creation of Keewatin and Algonoma into a separate province and the placing of Old Ontario in a third rate position among the other provinces in the near future.

3. For the convenience of the explorer it is preferable that all locations should be staked out, and a discovery post planted so that another explorer passing over these lands at a subsequent date will know that it is useless for him to spend his time in exploring same as some other licensee has acquired such location, and by examining the discovery he may secure some valuable information in assisting him to explore the adjoining lands, and it makes a better check as to whether a valuable discovery has really been made or not. Application should be made within fifteen days and then if such applicant is the first discoverer, and the first to stake out, his right thereto should be valid, *even although he may not have staked out his claim in accordance with all the regulations applicable thereto* and his application should then be the basis of his title.

The acquiring of a large agricultural and mining population for New Ontario is of supreme importance to the manufacturing, mercantile and financial interests of Old Ontario.

JOHN McKAY.

Sault Ste. Marie, Ont.

To the Editor:—

Sir,—Although we have now a Minister of Lands and Mines in Ontario, I do not expect to see



the much-needed improvements made in our mining law under the new regime. But as my friend, Mr. J. B. Hammond, and I have been foremost in trying to get three successive governments in Ontario to adopt a more liberal and progressive mining policy during the past fifteen years, we send you our views on the situation.

To begin with, there are two special difficulties in getting any government in Ontario to enact a proper mining law. First, the greater value put by the people of older Ontario upon the pine timber, or what is left of it, than upon the mineral resources of the Province. Second, party desire for political advantage in making any changes in the mining law, and especially in the administration of the law. And, unfortunately, for our mining interests, it is already quite evident that this latter evil is more likely to be aggravated than lessened by the present Ontario Government, we are sorry to say.

It would take an exhaustive article to do full justice to such an important matter, but until we know what the "proposed changes" to be made in the mining law are, we can only point out what in our opinion some of them, at least, should be.

First, then, as to the terms and conditions under which mineral lands should be opened to be explored and taken up, we have always maintained that as the poor, wandering prospector is the pioneer of the mining industry, he surely ought to be accorded the same chance as the settler on farming lands. But he has never been so treated in Ontario—far from it. For by the present exacting regulations he has to pay from \$2 to \$3.50 an acre in 60 and 90 days for any claim he takes up, or before he can find out in most cases whether it is of any actual value or not, and then expend from \$6 to \$7 an acre in development work, or including the price of the land and various other outlays for which no allowance is made, over \$10 an acre all told! Not one prospector in a thousand can comply with such onerous terms, and so the only thing he can do is to sell his discovery for little or nothing, or an interest in it, to a partner with money, and who, eventually, gets the whole claim as a rule.

Now, instead of such burdensome and complicated regulations for taking up mineral lands, and the continual patching of the present Mines Act, what is really wanted is a simple, just, well-defined and permanent mining law, brand new from first to last, and of uniform application to the whole province.

We also believe that the government would get more revenue out of mineral lands by putting the price at \$2.50 an acre in surveyed townships and \$2 an acre in unsurveyed territory, instead of the present long scale of different prices. Then the amount now required to be expended on development work should be cut down one-half or, say, to \$3 an acre, and only one year to be allowed for doing such work. At the end of that time the claim should be either paid for or cancelled. The man who cannot find out in twelve months if a claim is worth paying for is neither a prospector nor a miner. Such terms would snug up and simplify the work of the De-

partment of Mines, and keep any number of claims from being indefinitely locked up. As to the size of claims the present regulations are fair enough. The largest nickel mine in the Sudbury district does not cover ten acres.

Second, as to what you call the "taxation of mines," oh, if you love your country do not mention such a thing except to condemn it! The mere suggestion of a royalty makes the soul of a Sudbury mine owner or prospector sick, and no wonder. For the royalty that was put on the nickel mines in 1891 only produced instead of revenue two bad results, and had to be abolished in the end. It destroyed the selling value of all the nickel properties it applied to for seven long waiting years, and, worse still, it enabled one company to get a practical monopoly of our nickel mines. Those who are engaged in the mining industry are quite willing to pay their fair share of the burdens of the community in the way of taxes, but they are not willing to be singled out for a special tax from which all other industries are free. The ordinary risks of mining are enough to take. Besides, in Ontario, except a few little broken stringers of silver-cobalt ore in a very circumscribed area in the Temiscaming district, nearly all the economic minerals so far discovered, such as nickel, iron and copper, are low grade ores and expensive to treat, notwithstanding all the windy yarns published in the daily press.

Third, a good "staking law," as they have in British Columbia and some of the Western States, is the ideal mining law where there is a regular vein system. But the endless complications that have been caused around Cobalt by plastering a defective and, indeed, absurd staking law on top of the old regulations, has, we fear, made any kind of a staking law unpopular in Ontario now, as the inevitable results are already to be seen there in vexatious lawsuits, enmities, disputes and the frequent jumping of claims.

But in unsurveyed territory a man should be allowed to stake his claim and run his own lines without having to go to the expense of getting a surveyor to do it at the very start. There should also be a recording office in every mining division, not merely to collect extortionate fees from the prospectors, but to give reliable information about the district and actually record claims as in British Columbia, and at the same scale of fees.

In short, Ontario is not in a position to give any pointers on mining or mining laws to the American continent, and has in this respect a great deal to learn yet. Canada is largely a mining country in its physical character, but until our governments take an independent stand, and give more substantial encouragement for our own people to invest in mining enterprises, we are likely to continue to be mainly producers of raw materials for the United States.

Yours, etc.,

A. McCHARLES,  
J. B. HAMMOND,

Sudbury, Aug. 31, 1905.



## ZINC RESOURCES OF BRITISH COLUMBIA.

Dr. Eugene Haanel, Superintendent of Mines, Ottawa, kindly sends us the following information in respect to the recently appointed Commission to investigate and report on the zinc resources of British Columbia:—

"I beg to inform you that Mr. Walter Renton Ingalls, the eminent zinc expert, has been appointed chief of the investigation; the field work has been placed in charge of Mr. Philip Argall, M.E., of Denver, Colorado, with Mr. A. C. Garde, M.E., of Nelson, as his assistant. The concentration experiments, according to modern methods, will be conducted at Denver, Colorado, by Mr. Wood. The examination will begin on the 1st of September, and start from Nelson, B.C. The following are the chief points to be covered by the investigation:—

- "1st. Examination of the present development of the mines to determine approximately the tonnage of zinc ore immediately available, its occurrence and character and the future prospects, together with the cost of mining.
- "2nd. Examination of the present methods of mining.
- "3rd. Investigation of the adaptability of the ores to the new methods of concentration (magnetic, electrostatic, etc.).
- "4th. Study of the conditions affecting the marketing of the concentrate, including the question of smelting in the province or elsewhere in Canada.
- "5th. Investigation of the possibility of special utilization of the zinc ore of high silver content.

"I presume you are acquainted with Mr. Garde, who is specially fitted to act as local mining engineer for the following reasons:—

- "1st. Mining Engineer of Zurich School of Mines.
- "2nd. Former manager of the Payne mine.
- "3rd. Favourably known to and approved by Mr. W. R. Ingalls.
- "4th. Endorsed as best man for Zinc Investigation by Provincial Mineralogist, Mr. Robertson.
- "5th. Author of a paper on Zinc Resources of British Columbia, read before the Canadian Mining Institute.
- "6th. First to draw public attention to zinc ore deposits in British Columbia by the publication of comprehensive statement of locations and occurrences. Nelson Daily News regards him as best informed authority on zinc ore deposits.

"The investigation will be extensive and comprehensive. Mr. W. R. Ingalls will visit the zinc districts to obtain such personal view as will enable him to arrive at proper conclusions affecting the development of the zinc industry of British Columbia. In his report he will deal with the economic features of the enquiry and furnish an analysis and summary of the data collected under his direction by his assistants in the field and in the concentration laboratory."

## AMERICAN ZINC DUTIES.

In reviewing the zinc situation the Mining Reporter of Denver, Colorado, says:

The past sixty days has witnessed a decided stir in zinc circles. Those interested in the mining and smelting of zinc, have arrayed themselves on opposing sides, and the present indications are that the contentions of both sides will be well supported in a fierce legal battle. It appears that owing to the conflicting sections of the Dingley tariff act, the United States treasury department has been undecided regarding the proper duty to collect on zinc bearing ores imported from Canada. At the time of the framing of the act zinc ores were not as important a factor as at the present time, and owing to the failure to

revise the tariff to meet the exigencies that now arise, zinc ores have been imported at only a nominal duty based on the small amount of lead contained. The attention of the secretary of the treasury was first called to the existing conditions by the Joplin Commercial Club. On its representations the secretary immediately levied a 20 per cent. duty upon British Columbia ores, instead of 1 to 2 cents per lb. on the lead contained, which is the rate of duty that has been in effect for some years. The ruling naturally stirred up the smelter men who have been importing British Columbia zinc, and they have arrayed themselves against the mining interests and the secretary of the treasury and propose to fight for a restoration of the original duty.

Following the decision of the secretary of the treasury, the price of zinc ores rose approximately \$3 per ton. It is hardly probable that this increase was brought about directly by the secretary's ruling, inasmuch as zinc has been commanding an increased price for almost a year and unless speculation has been occasioned by the ruling, the most probable cause for the rise in the price of zinc ores would be an increase in the value of spelter.

Should the mine operators be successful in the suit which they propose bringing to force the levy of a 20 per cent. duty it is undoubtedly true that Canadian zinc will be excluded from the market. This would inflict a heavy blow on a young and promising Canadian industry, but judging from the effects of the analogous circumstances, which appertained to the development of the lead mining industry in British Columbia, the outcome of the present agitation may result in the establishment in Canada of plants for the treatment and manufacture of zinc.

## AN IMPORTANT MINING DECISION.

In our last number (p. 27) we referred to an argument in a very important mining case before the Hon. Frank Cochrane, Minister of Lands and Mines for the Province of Ontario. The dispute was between Mr. Dick, representing the Edison Company, and Mr. A. H. Beath, of Sudbury, and involved the ownership of a large area of mining lands. On behalf of Mr. Beath it was claimed that the applications of the Edison Company not having been followed up by compliance with the provisions of the Mines Act, were in the nature of applications and should not be countenanced. On behalf of the Edison Company, it was claimed that as no notice of forfeiture requiring them to comply with the Act had been sent, that the applications should be treated as valid, and being the first application should be granted notwithstanding that the Act was not strictly complied with. It was also contended that Mr. Beath could not comply with the provisions of the Mines Act requiring an affidavit of discovery, inasmuch as to his knowledge mineral had been previously discovered on the property on behalf of the Edison Company.

This decision will form an important precedent, and may be taken as a notice to all concerned that the provisions of the Mines Act will hereafter be more strictly carried out.

The Edison Company were represented on the argument by the Hon. S. H. Blake, K.C., and Mr. Macdonald—Mr. A. H. Beath, in whose favour the decision was rendered, by Mr. J. M. Clark, K.C.

## CANADIAN MINERALS AT LIEGE.

Our special correspondent at the Liege Exposition writes:—"Although I have nothing special to report this month, visitors to the Canadian Pavilion are still numerous, and the mineral exhibit continues to attract much attention. This week (August 18th) our exhibit of minerals was visited by the Exposition Jury, and the display received the highest award, the 'Grand Prix.'

"The Congress of Mines and Metallurgy proved very successful, and next month there will be a Congress of Geology, and the first Congress of Radiology."



### THE HENDRYX PROCESS AT NELSON.

The Nelson News states that the Hendryx cyanide plant has been successfully tested at the property of the Reliance Gold Mining Company, the values saved being 95 per cent.

The ore is received in a bin at the lower terminal of the aerial tram, 1,700 feet in length. The coarse ore passes over a slanting grizzly, then to a Blake crusher, and then, with the ore that was already fine, passes between rolls, 36 x 14. From the rolls, the crushed ore falls to the feed bin, from which, still by gravity, it is passed into the Chilean mill. There it is reduced to pulp and mixed with a cyanide solution, which passes over amalgamation plates on which nearly 60 per cent. of the gold is saved.

The liquid solution then passes through a series of ten storage settlers, and thence conveyed by launders to the Hendryx agitator. After from six to eight hours in the agitator the remaining gold values are on the plates that are contained in it. In the agitator the solution is continually exposed to the air by the revolution of the propeller, which hastens the separating process.

The solution and the tailings pass from the agitator to a decanter, from the bottom of which the tailings are drawn away to the creek. The then clear solution of cyanide passes to a sump tank, from which by centrifugal pumps, it is returned to the storage settlers, and from there to the original storage tank, so that the same solution is available for use again.

The amount of cyanide required for the process is never more than a pound to a ton of ore, and averages two-fifths of a pound. As the same solution may be used repeatedly, with small additions, and as the cost of cyanide is 23 cents a pound, it may readily be seen that the process is a decided success, economically as well as mechanically.

Mr. S. Lay, the company's superintendent and metallurgist, has increased the sensitiveness of the plates in the agitator by using galvanized plates for the purpose. Dr. Hendryx is making a further improvement by enclosing the plates in a vacuum, covered with a filtering envelope. The vacuum will then draw only the clear solution to the plates and precipitate the gold.

### COPPER MARKET SITUATION.

Messrs Henry R. Merton & Co., of London, report:—

The upward movement has again made considerable progress and the price of refined copper stands to-day higher than it did during the rise in 1901. The reason for this is to be found in the unexampled state of the consumption of the metal. When copper was at its high level four years ago, the market was manipulated to a great extent by American operators, who controlled a fairly large stock of unsold material.

At present the market is free from manipulation, and there are no surplus stocks of metal—indeed there is a scarcity of good brands and but a small supply of the cheaper qualities. Production is very large and growing, but consumption is outstripping it, and has absorbed all the accumulations of recent years. There is every prospect of further expansion, especially in the electrical industries, where the electrification of railways and the transmission of power have become potent factors which must be reckoned with in the future.

The enquiry throughout the week has again been very large, and important contracts have been entered into by consumers for forward delivery, whilst fancy prices were paid for metal available between now and October. The Amalgamated Co. have repeatedly raised their price, which is now 15½ cents for November and December delivery; they have but little copper left for these two months and none for earlier delivery. The Calumet & Hecla Co. having sold very largely to home consumers are now in a similar position, whilst the other American producers command scarcely anything more for this year. In Europe the situation is similar.

Messrs. Morrison, Kekewich & Co., of London, write under recent date: Bi-monthly statistics show an increase of 112 tons in stocks and 612 tons in total visible supplies. The position of the market at the moment is one of exceptional strength. Consumption continues at an enormous rate and has completely overtaken production. Consumers have been obliged to buy freely against future requirements, with the result that in most cases producers are sold out until the end of the year. Prevailing conditions point to the employment of immense quantities of copper for years to come, and the scarceness from which we are now suffering can easily develop into a famine.

Messrs. James Lewis & Sons report: Consumers both in the United States and in Europe have at last begun to realize the exceptionally strong position of copper, and the great curtailment of supplies to Europe is now acutely felt. This has resulted in very large transactions for delivery not only over this year, but up to May of 1906.

### THE INTRODUCTION OF STEAM SHOVELS IN THE ATLIN DISTRICT.

One of the companies operating in the Atlin district, in British Columbia, The Northern Mines, Limited, recently completed the installation of a steam shovel plant, for placer mining purposes. The plant includes a "Little Giant Special" shovel, with a capacity of 1,000 yards in 10 hours, manufactured by the Vulcan Iron Works, Toledo, Ohio; an auxiliary hoisting plant; 2,000 feet of flume, and 200 feet of sluices. The Atlin "Claim" states that operations have already been successfully initiated.

The shovel has been placed on a stratum of clay cement in a pit excavated for the purpose. The dirt is deposited by the shovel into skips holding 1 1-4 yards, which are hoisted by the auxiliary plant on a cableway conveyor some 40 feet to the dump box. At the end of the dump box there is a grizzly which cuts out all rock over three inches, from there the gravel travels over 60 feet of block riffles, at the end of this sluice there is another grizzly which cuts out all material over 3-8 of an inch, and the remaining gravel then passes over another 40 feet of sluice to the dump. From the height of the sluices, some 40 feet, there has been provided an ample dump, and the possibility of a block by tailings has been greatly minimized.

During subsequent tests for a 3-hour run some 95 buckets were handled and it is estimated that 800 yards per day can be handled with ease.

### OUR LONDON LETTER.

(From a Special Correspondent.)

The London mining market is still in an apathetic condition. Prices, especially in the South African section—which section governs practically every other department—have been falling month by month with monotonous regularity, and although there have been occasional recoveries, prices are very much below the levels current during the last two months of last year. The regrettable part of the whole business is that no matter how low prices fall, the public does not seem to show the slightest inclination to pick up, what are undoubtedly in many cases, on intrinsic merits, really bargains. The political atmosphere throughout the year has been so highly charged that the public are apparently unwilling to venture into such a disturbed area. Canadian mining shares known and dealt in on the London market, are, as your readers are aware, chiefly confined to the remnant of those British Columbian concerns, which were floated in such reckless haste in 1896-8. It is a very attenuated list indeed, and its record since the eclipse of the ill-fated Whitaker-Wright has been a dismal one. Now and again one of the Le Rois moves 1-16 or so, but it can safely be said at the present moment that Canadian mining descriptions generally are very much under a cloud—and the latest developments in question with the Tyee Copper Company are likely to



discredit the market still more in the eyes of the English investor. For some time past these shares have been freely offered at material concessions, and the quotation which at one time stood in the neighbourhood of £3, has recently been as low as 15s. Recent events have of course been of an exceedingly disappointing nature, and at the meeting held on the 18th ult. it was speedily apparent that in addition to discouraging mining developments there was dissension on the board. The meeting, in fact, resolved itself into a prolonged squabble between the Loeffler and the Livingston interests. In the end, Mr. Ludwig Loeffler and his friends carried the day, and as a result Messrs. E. B. Livingston and Hodges were not re-elected, Mr. Ludwig Loeffler and Mr. Nicol Brown taking their places. No doubt Mr. Loeffler, by his timely financial assistances, was entitled to ample representation on the board, but his interests are now, of course, paramount, and it will be interesting to see what will happen. Incidentally it may be mentioned that the real trouble seems to have arisen in connection with the formation of a company to acquire the deep level area of the Tyee formation [This supposition is absurd.—Editor C. M. R.]—a concern in which Mr. Livingston and his friends (including Mr. Gardner, the secretary of the Tyee Copper Company) were primarily interested. The formation of this company seems to have deeply offended Mr. Loeffler and his group, and brought the matter to a head. As to the ethical side of the question, it is vain to speculate; the shareholders as a body seem quite unconcerned. Lugubrious as was Mr. Loeffler's attitude at the meeting, it will not be surprising if there is presently a sharp recovery in the price of the shares. Under Teutonic control it may be taken for granted that everything possible will be done to justify such a movement. In the doings of the Colorado and other properties dealt in in the British Columbia market, such as Camp Bird, Stratton's Independence, etc., you will have little or no real interest, but it may be worth stating en passant that these have been well supported of late, whilst special attention is being paid to Mexican and Argentine mining propositions, and it is expected that there is likely to be lively times ahead for both sections.

With regard to the Rossland amalgamation scheme, little has been divulged here, even the shareholders of Le Roi being kept absolutely in the dark as to the developments. The remarks in your editorial columns, from the pen of an evidently well-informed writer, have aroused a good deal of attention, but keen as is the interest taken in the proposal, the effect upon the quotations of the two Le Rois has been practically nil, all one can say is that Le Roi has at times shown a hardening tendency. The days of wild fluctuations in these shares apparently ended with the downfall of the once all-powerful financier who was the medium for introducing the property to the British investor. Ontario properties have dropped out of the lists, and the erstwhile active Klondyke companies are never mentioned now. British Columbia, Ontario, Klondyke, are all out of favour, and until a few of the companies still struggling on can show some return upon the capital invested in them by the public here, there is little chance of any revival in this market. You will remember the recent flotation of the Western Canada Pulp & Paper Co., Limited. This concern has been singularly ill-fated. Its inception was exceedingly prolonged, and it was actually floated at such an inauspicious moment, that the underwriters are said to have had to take up over 90 per cent. of the amount they underwrote. Immediately following upon the allotment of shares legal trouble commenced, "owing to the company having failed"—in the words of the chairman at the recent statutory meeting—"to obey the letter of the law in accepting cheques in payment of allotment money." The whole question resolves itself into a fine legal point, and the company was beaten. I am told that a number of shareholders intend to avail themselves of this quibble to get out of the company. On the other hand, the chairman, Mr. W. C. Ward, said that "the large shareholders had come to the rescue," and that by their assistance the company might yet be saved. Apparently, however, the fate of the company—

brought out under excellent auspices, and possessing all the elements of a successful concern—will not be known the beginning of next month. Herewith I send you full particulars and diagrams of the "Phoenix indicating gauge," which is being shortly placed on the market, and concerning which you may care to deal more fully in your columns. I understand that a valuable reference book, the "Mines of the Transvaal," is now in course of revision, and that the new edition will shortly be ready. The British Columbia Development Association seems to be struggling on, but it is, of course, quite a negligible quantity from the market point of view. The Canadian business men have been having a good time here and on the Continent, and it is hoped that good results will follow their visit. In mining circles keen interest still centres in the results attending the use of tube mills in South Africa. Those responsible for their introduction to the stand predict very large economies from their adoption.

### MINING MEN AND AFFAIRS.

Mr. W. C. Thomas has been appointed smelter superintendent of the Dominion Copper Company's works at Boundary Falls, B.C.

Mr. F. W. Rolt, of Rossland, has been appointed, it is announced, a director of the Le Roi Mining Company, in place of Mr. Jewel, who has resigned from the board.

Mr. J. L. Stamford, president and managing director of the Northwest Coal & Coke Co., has returned to Nelson, B.C., from a four months' visit to England.

Much regret is expressed at the death of Mr. D. McLaren, which occurred in Montreal on August 25th. Mr. McLaren was president of the J. C. McLaren Belting Company, which was founded by his father in 1856.

According to a report recently published in the Rossland Miner, Mr. A. J. MacMillan retired from the general management of the Le Roi Mining Company on the 1st September, at the request of the London Board.

Mr. Herman Bellinger, the well-known American metallurgist, who was associated with Mr. James Breen in the erection and operation of the Crofton smelter, V.I., has been retained by the American Smelting & Refining Company as consulting metallurgist.

A Boston financial paper originates the rumor that Mr. Graham Fraser, director of works of the Dominion Iron & Steel Co., at Sydney, is to assume his old position as general manager of the Nova Scotia Steel & Coal Co. We shall be much surprised if this report proves to be true.

Mr. B. C. Wilson, the well-known gold miner of Nova Scotia, and for many years superintendent of the Acadia Powder Company, died suddenly on Saturday, September 1st, at his home in Waverley. Mr. Wilson's first mining experience was gained in California in 1850.

Prof. J. C. Gwillim, of Kingston University, spent the greater part of July and August visiting the mining districts of the Kootenays, British Columbia. Referring to the general conditions there, Prof. Gwillim states that a marked improvement had taken place in the last three or four years.

The new Minister, for the Province of Quebec, of Colonization, Mines and Fisheries, the Hon. J. B. Prevost, recently returned from visiting what is now described as "New Quebec." He is convinced that this region will ere long prove quite as valuable as the new areas opening up in Ontario.

F. H. Sherman, of Frank, Alberta, president of the District Union of the Union Mine Workers of America, has been nominated as the Labour candidate for the Provincial Parliament, from that section. Before Mr. Sherman may accept the nomination, he must first seek the permission of this alien labour organization. Truly a remarkable state of affairs!

Mr. S. Herbert Cox, A.R.S.M., has been appointed Professor of Mining at the Royal School of Mines, South Kensington, London, vacated on the death of Sir Clement



le Neve Foster. Mr. Cox was president of the Institution of Mining & Metallurgy in 1899-1900, and has had a large and varied mining experience in England, France, Spain, Egypt, United States and Canada.

The death occurred at St. John, on August 15th, of Mr. William C. Dick, at one time mechanical superintendent of the Cumberland Railway & Coal Co. The deceased was also for many years prominently identified with the coal mining industry of Nova Scotia. He leaves a widow, two daughters, and three sons, one of whom is Mr. Alex. Dick, general sales agent of the Dominion Coal Co.

Mr. G. O. Buchanan, Inspector under the Lead Bounties Act, was recently interviewed by the Trout Lake Mining Review, and expressed the opinion that more actual mining development was now in progress in British Columbia than has been the case at any previous time. He further remarked that there was now much capital available for mining investment, provided claim owners would show a reasonable disposition in dealing with capitalists.

The Britannia Syndicate is to be congratulated on having secured the services, as smelter manager, of Mr. Thos. Kiddie, who has resigned his position with the Tyee Copper Co., at Ladysmith, to take charge of the Crofton works. Mr. Kiddie has established for himself a remarkable record in connection with the operation of the Tyee Copper Co.'s smelter, where a difficult and refractory ore has been treated at a cost which a few years ago would have been deemed impossibly low.

The following firms have expressed their desire to purchase Canadian ores and minerals direct. The demand is chiefly for zinc, chrome, nickel, cobalt, asbestos, mica, phosphate, coal and corundum: Messrs. Armand & Co., Paris, desire to purchase copper; M. de Rosenorn, Bordeaux, Canadian phosphate; Edmond Gersenberger, Liege, ferro-silicon, containing 35 per cent. of silica; F. Pradez, Liege, zinc and lead ores; Leon Deugmond, Brussels, mica; D. Carnegie, Hadfield Steel Foundry Co., Sheffield, corundum.

Mr. J. D. Kendall, the well-known mining engineer, London, arrived at Slough Creek, in the Cariboo district, B.C., in August, on a visit of inspection. Shortly after his arrival he cabled the London office that the property is now in first-rate order, the water gradually decreasing, and the difficulty in this respect appears to have been overcome. The average value of the samples taken from the mine are, approximately, \$5.00 to the square yard. Before returning to England, Mr. Kendall will visit and report on properties in the Kootenays.

Mr. Henry Harris, of the Hall Mining & Smelting Co., Nelson, B.C., received last month a Mexican patent on an improved device for effecting the separation and distribution, through separate outlets, of the matte and slag of a smelting furnace. The advantage of Mr. Harris' invention lies in the fact that the separation which has been effected in the furnace under favorable conditions of heat and quiescence is maintained during the outflow, and that the molten material is maintained at a constant height in the furnace in relation to the tuyeres.

A convention of the Canadian Forestry Association is to be held in Ottawa in January of next year, and it is hoped that delegates representing the mining industry will attend. The matter of the destruction of our forests by the periodical and destructive bush fires is of great moment to the mining interests. During the recent summer, for example, some very destructive fires are reported to have occurred in the Kootenay mining camps, and especially in the Ymir district, where not only much valuable timber, but also mine plant and equipment was destroyed.

Col. G. Porter, R.E., master of the Calcutta Mint, India, paid an official visit to Sudbury during August, in order to ascertain whether arrangements could be made to utilize nickel from these mines for coinage purposes in India. Col. Porter, accompanied by Mr. A. P. Turner, of the Canadian Copper Co., Professor Brown, Major Leckie and others, visited the Gertrude mine, and afterwards the

Creighton property. On returning to Copper Cliff, Col. Porter and the party were entertained at lunch by Mr. Turner. Before leaving for Toronto he also visited the Victoria mines, going over the plant there in company with the manager, Mr. Hickson.

Dr. Goodwin, of Kingston, who has recently spent some weeks in the Temiskaming silver region, like many of his confreres, is most enthusiastic regarding the prospects of this new territory, which has already made a most extraordinarily good showing. In an interview, he is reported to have said:—"The best feature of the Temiskaming silver district is that most of the discoveries have been made by Canadians, and they have retained possession of the property. Very few sales are recorded. The men who discover the mineral find that they need no capital to develop their properties. Already prospectors are looking with longing eyes at the timber limits to the south of the district, and where prospecting is forbidden. It is believed that the Government may arrange to throw the northern triangle of these limits open.

At a recent meeting of the Transvaal Chamber of Mines, a Mr. Chaplin gave some interesting figures as to the comparative costs of coolie versus Kaffir labour. The non-recoverable cost of the importation of each coolie is given at \$85, of which \$55 was already charged, while \$30 would be required for repatriation, against which the cost of recruiting a Kaffir is about \$20. Reckoning the Kaffir to stay on an average of 15 months, and the irrecoverable cost to be \$16 per native per annum, the cost for three years would be \$47 per Kaffir, as against \$85 per coolie. Fortunately, there appears to be good reason to believe that the continuity of employment ensured by the three years' contract, and the gradually increasing efficiency of the coolie would in the end compensate the companies for the extra expenditure incurred at the time of importation—an expense which was obviously impossible for all companies to face.

At the Sixteenth International Congress of Miners, which began its sittings at Liege, on August 18th, a resolution was passed in favour of limiting work in mines to eight hours. This resolution, which included surface workers in the eight hour restriction, was carried, the Northumberland and Durham delegates alone voting against it. The following resolution was carried unanimously:—"The Sixteenth International Congress of Miners, assembled at Liege, unanimously resolves that, in the interests of the workers of the world, all international questions should be settled by arbitration." A further resolution was also adopted to the effect that the Congress expressed its warmest sympathy with the Russian workers in their struggles for industrial freedom, and wished them complete success. Other resolutions dealt with the establishment of a minimum wage by law, and frequent mines inspections by workmen inspectors, elected by the workers and paid by the state.

Mr. J. W. Broomhead, a well known mining authority, writing in the London Financial Times, refers as follows to dredging operations in British Columbia: "Dredging for gold in British Columbia has not been a commercial success, notwithstanding all the efforts to overcome difficulties. Many of the propositions started have had ground of payable value, free from snags or embedded trees, boulders or hard clay cement, a good bed for dredging and gold not too fine to be easily recovered. The difficulty has mainly been mechanical, and in cases the dredges have been of too weak construction to stand the work, necessitating frequent stoppages for repairs. An occasional boulder in dredging is easily overcome if there is sufficient room for the dredge to work below, so as to undermine it, when it can be toppled over and the ground dredged over the site of the boulder, when more gold may be expected; but the difficulty comes in when boulders lie too closely together for the dredge to work between them."

Mr. H. E. T. Haultain recently arrived from Arizona to assume the managership of the Canada Corundum Co.'s works at Craigmount, Renfrew County, Ont. Mr. Haultain



graduated from the School of Practical Science, Toronto, as a gold medallist, in 1889, and after two years of post-graduate work at Frieberg, Germany, where he specialized in mining engineering, he became manager of the St. Mauritius tin mines, of Bohemia, where he built and operated a second plant for the company. Thence he went to the Rand, where he designed three stamp mills. On the outbreak of the war he returned to Canada and was appointed manager of the Yellowstone mine in British Columbia, and afterwards of the Arlington. In 1903, on the formation of the Federal Mining and Smelting Company, he was employed to take general charge of the different mills of this corporation, the aggregate capacity of whose mills is nearly 3,000 tons daily. Since then he has been travelling in Idaho, South Dakota, Colorado, Nevada and Arizona, studying the methods of concentration in these states.

### NEW BOOKS AND PUBLICATIONS.

**The Copper Handbook.** Vol. v, 1905. Royal octavo, 882 pp. \$5; in full library morocco, \$7.50; Horace J. Stevens, Houghton, Michigan, U.S.A.

The fifth annual edition of the Copper Handbook contains 16 chapters, devoted to the history, uses, terminology, geology, geography, chemistry, mineralogy, finances and statistics of copper. The major part of the book is occupied by the chapter devoted to detailed descriptions of the copper mines of the world, 3,849 in number. These descriptions range from two lines to twelve pages each, according to importance of the property. In the five years of its issue, the Copper Handbook has grown from a strictly local publication, the first issue having been devoted exclusively to Lake Superior mines, to a standard reference book on copper production.

**Digest of Evidence Given Before the Royal Commission on Coal Supplies, 1901-1905.** (in three volumes). Vol. I. London: The Chichester Press, 30 and 31 Furnival Street, Holborn, E.C.

This comprehensive work, as the title implies, is a digest of the evidence given before the British Royal Commission on Coal Supplies, reprinted from the Colliery Guardian, the matter being re-arranged and classified under separate heads, thus rendering the evidence more readily accessible. The present volume deals with the working of the seams, limit of depth in mining, waste in working and coal-cutting by machinery.

**The Copper Mines of Lake Superior,** written by the late editor of the Engineering & Mining Journal, Mr. T. A. Rickard, is a fresh presentation, in admirable form, of many facts concerning the most wonderful copper-producing district in the world. Mr. Rickard is blessed with a facile pen, and his natural wealth of expression leads one to believe that had he chosen Belles Lettres for his profession instead of mining, he would have reached in literature a position equivalently high to that which he occupies in mining. The book, which contains 164 pages, details the history, methods of exploitation, geological conditions and methods of ore treatment of the copper mines of the Keeweenaw peninsula.

While figures are apt to create an exceeding weariness, the recital of Mr. Rickard's figures is accompanied with no such feeling. The "style" is good, and we can recall no similar amount of instruction which was imparted so pleasantly. The second chapter, on "Geology," is a brief epitome of the works of Van Hise, Pumpelly, Irving, et al., and is a clear exposition of the subject. The third, fourth and fifth chapters are historical, and the fourth, which somewhat details the history of the Calumet and Hecla property, is not only instructive but most entertaining.

The chapter on mining methods suffers from condensation, and could very profitably have occupied three times the space, while Mr. Rickard's criticism that the lodes are not subject to accurate sampling methods, is attached to a chapter on "Exploration."

Chapter four deals with milling methods, and is a fair criticism of the existing forms; whether the new Champion mill will remedy the error of the older mills, and its methods be applicable to some of the Calumet rock, is problematical. Mr. Rickard might have said more of the loss in the tailings of the Calumet and Tamarack had he been permitted access to these properties.

The book is strongly recommended to all who are interested in copper, or who enjoy reading good English, clearly expressed.

**Cements, Limes and Plasters: Their Materials, Manufacture and Properties.** By Edwin C. Eckel, C.E. First edition, 8vo, cloth. New York: John Wiley & Sons. London: Chapman & Hall, Limited, 1905. Price \$6.00.

### PIG IRON PRODUCTION IN CANADA.

Statistics of the production of pig iron in Canada during the first six months of 1905 show a large increase as compared with corresponding periods during 1904. This is shown by the following table:—

|                | 1904.       |              | 1905.       |
|----------------|-------------|--------------|-------------|
|                | First Half. | Second Half. | First Half. |
| Coke .....     | 111,840     | 139,831      | 188,541     |
| Charcoal ..... | 8,803       | 10,468       | 21,665      |
| Total .....    | 120,643     | 150,299      | 210,206     |

The Canadian production of pig iron in the first half of 1905 was the greatest in any half year in the history of the Dominion, exceeding by 48,453 tons that of the last half of 1902, the next highest half year, when 161,753 tons were made. It was also greater than the production of any whole year prior to 1901. Down to that year the production of pig iron in Canada never amounted to 100,000 tons in any calendar year.

The production of Bessemer pig iron in the first half of 1905 amounted to 63,785 tons. There was no production of Bessemer pig iron in the first half of 1904, and only 26,016 tons were made in the second half of that year. The production of basic pig iron in the first half of 1905 amounted to 68,378 tons, against 28,981 tons in the first half of 1904 and 41,152 tons in the second half.

The unsold pig iron held by Canadian manufacturers on June 30, 1905, none of which was intended for their own consumption, amounted to 35,629 gross tons, as compared with 35,119 tons on December 31, 1904, and 36,868 tons on June 30, 1904. Of the unsold stocks on June 30, 1905, a little less than 6,500 tons were made with charcoal, the remainder being coke iron.

On June 30, 1905, Canada had 16 completed blast furnaces, of which 11 were in blast and five were idle. Of this total, 11 were equipped to use coke and five to use charcoal.

During the first half of 1905 the total number of furnaces in Canada actually in blast for the whole or a part of the period was 13, of which eight used coke and five used charcoal.

The Dominion Iron & Steel Co., Limited, of Sydney, N.S., had two of its four coke furnaces in blast on June 30. One of the idle furnaces is to resume about October 1.

The Nova Scotia Steel & Coal Co., Limited, of New Glasgow, N.S., operated its new furnaces at Sydney Mines, Cape Breton, for 180 days during the first half of 1905 and was running it on June 30. The company has virtually abandoned its Ferrona Furnace, at Ferrona.

Messrs. John McDougall & Co., of Montreal, had one of their two charcoal furnaces at Drummondville in operation on June 30. During the first half of the year both furnaces were running, one for 112 and the other for 49 days. The idle furnace may resume next winter.

The Algoma Steel Co., Limited, of Sault Ste. Marie, Ont., blew in its No. 1 furnace (charcoal) for the first time on March 1, 1905, and it was running on June 30. Its No. 2 furnace (coke) was in operation during the whole



of the first half of 1905. The construction of furnaces Nos. 3 and 4 (coke) was not resumed in 1905.

The Deseronto Iron Co., Limited, of Deseronto, Ont., operated its furnace on charcoal for 181 days during the first half of 1905, and it was running on June 30.

The Hamilton Steel & Iron Co., Limited, of Hamilton, Ont., was operating its furnace on June 30. It ran for 150 days in the first half of 1905 on basic and foundry pig iron.

The Canada Iron Furnace Co., Limited, of Montreal, had its Radnor and Midland furnaces in operation on June 30. Radnor (charcoal) ran for 113 days and Midland (coke) for 167 days during the first half of the year. Bessemer pig iron was chiefly made at Midland.

The Northern Iron & Steel Co., Limited, of Collingwood, Ont., did not work whatever in the first half of 1905 on the furnace for which excavations were made in 1902, but upon which work was suspended in 1903.

The Atikokan Iron Co., Limited, of Port Arthur, Ont., broke ground early in August for its new blast furnace at Port Arthur. It will be 75 by 15 feet, will be equipped with 3 Roberts stoves, will use magnetic iron ore from the Atikokan range, which is located about 130 miles west of Port Arthur, and will have an annual capacity of about 30,000 tons of foundry and Bessemer pig iron. Coke will be made in ovens near the furnace. The officers are: Mr. D. D. Mann, president; Mr. J. C. Hunter, vice-president; Mr. Hugh Sutherland, secretary and treasurer; and Mr. Robert R. Jones, general manager.

### CANADIAN MINING STATISTICS.

Lead production in British Columbia for the fiscal year 1904-5, ending June 30th, upon which the Government bounty was paid, aggregated 55,703,534 lbs., \$336,886 having been paid thereon in the form of bounties to producers.

Preliminary reports received by the Department of Mines, Victoria, B.C., from Atlin, are to the effect that the output from this district for the season will exceed the returns of 1904. The estimated yield for the year is valued at between \$600,000 and \$700,000.

The returns of the Hall Mine smelter, Nelson, B.C., for the month of July, were:—

|                        |                |
|------------------------|----------------|
| Ore .....              | 6,177,107 lbs. |
| Lead .....             | 2,647,740 lbs. |
| Of the Trail smelter:— |                |
| Ore (net weight) ..... | 2,517,821 lbs. |
| Lead .....             | 1,320,090 lbs. |

Intelligence from Atlin, B.C., is to the effect that the output made, so far, from that district is valued approximately at \$300,000, while the season will probably not close for another 10 weeks.

The tonnage of ore produced from the Rossland mines, to the end of August, is, in round figures, placed at 220,000 tons. Of this, the Le Roi has output 80,000 tons, the Centre Star 65,000 tons, and the War Eagle 45,000 tons.

The Ontario Bureau of Mines has issued a bulletin showing the total value of the output of the metalliferous mines and works of the province for the first six months of the present year, as follows:—

|                     | Quantity. | Value.      |
|---------------------|-----------|-------------|
| Gold, oz. ....      | 2,931     | \$ 25,093   |
| Silver, oz. ....    | 1,128,212 | 595,974     |
| Nickel, tons ....   | 4,671     | 1,638,040   |
| Copper, tons ....   | 2,256     | 335,637     |
| Cobalt, tons ....   | 65        | 80,560      |
| Iron ore, tons .... | 113,583   | 274,224     |
| Pig iron, tons .... | 116,794   | 1,510,197   |
| Steel, tons ....    | 64,527    | 2,070,003   |
|                     |           | \$6,520,728 |

Practically all the silver, all the cobalt and thirty-two tons of the nickel was produced from the mines in Cole-

man Township. The metals produced from these mines were:—

|                    | Quantity. | Value.    |
|--------------------|-----------|-----------|
| Silver, oz. ....   | 1,121,762 | \$592,749 |
| Cobalt, tons ....  | 65        | 80,500    |
| Nickel, tons ....  | 32        | 8,987     |
| Arsenic, tons .... | 281       | 2,583     |
|                    |           | \$684,819 |

The quantity of ore shipped from these deposits during the half-year was 891 tons, so that the average value realized for the ore as shipped was \$768.66 per ton. The average contents of the shipments were 31 per cent. arsenic, 3.6 per cent. nickel, 7.3 per cent. cobalt, and 1.257 ounces of silver per ton.

Shipments from the Boundary district, B.C., for the seven months ending July 31st, were as follows:—

|                    | Tons.   |
|--------------------|---------|
| January .....      | 68,074  |
| February .....     | 72,671  |
| March .....        | 90,047  |
| April .....        | 80,102  |
| May .....          | 80,044  |
| June .....         | 67,255  |
| July .....         | 69,681  |
| Seven months ..... | 527,874 |

The chief producers in this district are: The Granby, which contributed over 300,000 tons; the B. C. Copper Co., about 90,000 tons; and the Montreal & Boston, 43,000 tons to the total result for the period mentioned.

### NEWFOUNDLAND COAL.

Commenting on the Seventh Annual Report of the Geological Survey of Newfoundland, which was noted somewhat extensively in the Review some months ago, the Colliery Guardian remarks:

"There are in Newfoundland, as well as in Cape Breton, such rich mines that, if the Crown would but grant leave to work them, their produce would be sufficient to supply all Europe and America abundantly with this commodity, and some are even so commodiously situated that coals might be thrown directly from the coalworks themselves into the ships as they lie close to the shore."

"I had this intelligence," wrote Dr. John Reinhold Foster in 1786, "from my late friend, the great circumnavigator, Captain Cook, who for several years successively explored the shores of Newfoundland."

It is a remarkable fact that, although Captain Cook's statement has been corroborated on many occasions since that time, to-day the position of Newfoundland as a coal producer marks a striking contrast to Cape Breton, with its flourishing collieries and important iron and steel industries. Last year Newfoundland exported no coal, importing about 165,000 tons.

### THE SAN FRANCISCO COAL MARKET.

Mr. Bennett H.M. Consul-General at San Francisco, transmits the following statistics of coal imports into San Francisco for the last four years:—

|                        | 1904.   | 1903.   | 1902.   | 1901.   |
|------------------------|---------|---------|---------|---------|
|                        | Tons.   | Tons.   | Tons.   | Tons.   |
| British Columbia ..... | 335,137 | 289,890 | 460,385 | 438,800 |
| Australia .....        | 148,409 | 276,186 | 190,859 | 150,200 |
| United Kingdom .....   | 66,330  | 65,075  | 77,113  | 89,200  |
| Other countries .....  | 54,245  | 102,210 | 7,350   | 8,400   |
| Total .....            | 604,121 | 733,370 | 744,707 | 695,600 |

The above figures show a heavy decrease in the imports from Australia, caused mainly by coal carriers being unable to find profitable employment on arrival. This has naturally forced shippers to pay higher freight rates on coal from Newcastle, New South Wales, and caused a



marked shrinkage in the quantity delivered. The amount received from British Columbia shows an increase, while the trade with the United Kingdom is about stationary. In addition to the above, 446,951 tons of United States coal were received by sea and rail against 482,184 tons in 1903, showing a decrease in the total receipts at the port of 164,482 tons as compared with the previous year.

### THE MONTH IN NOVA SCOTIA.

(From Our Special Correspondent.)

**Cumberland County.**—The Standard Coal & Railway Co. held an important meeting at Parrsboro this month, at which Mr. Lynn, C.E., submitted a report regarding the company's proposed railway, which was followed by a discussion as to location and routes. Of these, the most favourable appears to be from Maccan to a point about two miles north of Parrsboro, with a branch line to Parrsboro. It is understood that the company will apply for the service of one of the Government core drills.

**Inverness County.**—Mr. Ira Taylor, of New York, passed through Halifax this month, and left for Margaree in the interests of the Chimney Corner coal areas, and it is probable that the working of those areas will shortly begin. In connection with the mines, it is also proposed to build a line of railway for shipment of coal to the coast.

**Cape Breton County.**—Work on the I.C.R. extension to Sydney Mines is being pushed forward. The rails are meanwhile laid, and ballasting is now in progress.

Very little work has been done at the gold mines of the province during the month.

The Pictou Development Co., at Renfrew, are carrying on development operations from which good results are to be shortly expected.

Mr. Rickard, mining engineer, has arrived in the province, and in company with Mr. Fairbuet, of the Geological Survey, Ottawa, and Mr. D'Arcy Weatherbe, left Halifax on the 15th of June on a visit to the gold districts in the eastern part of the province.

The latest mill returns show the following crushings and yield of gold:—

|                                 | Tons. | Oz. | Dwt. | Grs. |
|---------------------------------|-------|-----|------|------|
| Modstock Mill, Stormont .....   | 459   | 89  | 0    | 0    |
| Dickson Mill, Stormont .....    | 436   | 151 | 10   | 9    |
| Anderson Mill, Lake Catcha..... | 10    | 5   | 13   | 9    |
| Mahon Mill, Vogler's Cove.....  | 200   | 43  | 7    | 19   |

Some 600 areas have been taken up during August, the larger portion of which have been renewals.

The areas, by districts, are as follows:—

#### Halifax County.

|                              |    |        |
|------------------------------|----|--------|
| Cow Bay district .....       | 16 | areas. |
| Harrigan Cove district ..... | 43 | "      |
| Tangier district .....       | 39 | "      |
| Caribou district .....       | 21 | "      |
| Montague district .....      | 9  | "      |
| Ragged Falls district .....  | 30 | "      |
| Oldham district .....        | 24 | "      |
| Scraggy Lake district .....  | 6  | "      |
| Salmon River district .....  | 9  | "      |

#### Guysboro' County.

|                              |     |        |
|------------------------------|-----|--------|
| Stormont district .....      | 154 | areas. |
| Miller's Lake district ..... | 60  | "      |
| Liscomb Mills district ..... | 25  | "      |

#### Lunenburg County.

|                           |    |        |
|---------------------------|----|--------|
| Blockhouse district ..... | 27 | areas. |
| Ovens district .....      | 22 | "      |
| Leipsigate district ..... | 12 | "      |
| Gold River district ..... | 25 | "      |

#### Queens County.

|                                        |    |        |
|----------------------------------------|----|--------|
| Mill Village district .....            | 19 | areas. |
| Pleasant River Barriers district ..... | 2  | "      |
| Fifteen Mile Brook district .....      | 12 | "      |
| Whiteburn district .....               | 20 | "      |

#### Yarmouth County.

|                         |   |        |
|-------------------------|---|--------|
| Carleton district ..... | 6 | areas. |
|-------------------------|---|--------|

#### Hants County.

|                        |    |        |
|------------------------|----|--------|
| Renfrew district ..... | 25 | areas. |
| Uniacke district ..... | 19 | "      |

### ONTARIO MINING INTELLIGENCE.

(From Our Special Correspondent.)

An exhibit of carborundum from the Carborundum Co., of Niagara Falls, was on view at the establishment of Messrs. Rice, Lewis & Co., of Toronto, and attracted much interest.

I am informed that mining operations have been commenced on the iron ore deposits recently acquired by Messrs. Mackenzie & Mann on the line of the Canadian Northern Railway, west of Port Arthur.

The American Smelting and Refining Co. has sent an expert to Northern Ontario to investigate the situation as regards the establishment of a refinery, and Parry Sound, Sudbury, Sault Ste. Marie and other mining centres have been visited.

The Sultana gold mine, on Lake of the Woods, is again producing bullion regularly, which is being shipped through the Imperial Bank. This mine is controlled by Messrs. J. S. Caldwell, of Winnipeg, and D. C. Cameron, of Rat Portage.

The Hon. J. P. Whitney, Premier of Ontario, recently left on a tour through New Ontario, which district he had not previously visited. It is hoped that the Premier will, as a result of his visit, be in a better position to judge as to the policy which the Government should pursue in dealing with the mineral interests of the region.

Corundum Refiners, Limited, had on exhibition at the Toronto National Fair a number of specimens of corundum from their mines at Jewellville, Renfrew County. The company has a force of men at work making roads, cutting timber, etc., but no mining is at present being carried on. When more has been learned of the most economical methods of manufacture, a mill will be erected.

The following mining licenses have been cancelled by the Ontario Department of Lands and Mines for non-payment of dues: License granted May, 1901, to Frederick Baptz, of Sault Ste. Marie, Ontario, and transferred to the Algoma Commercial Co., of lands in the township of Snider; license granted February, 1905, to John E. Hughes, Ernest C. Cotter and George H. Chadeayne, of Buffalo, N.Y., of lands in the township of Faraday; license granted December, 1901, to John McKay and Thos. John Kennedy, of Sault Ste. Marie, and transferred to the Algoma Commercial Co., of lands in the township of Waters.

A large block of land has been purchased at North Bay for the erection of a smelter to treat the cobalt ores, though it is the intention to develop it into one for the treatment of ores in general. North Bay is regarded as a good centre, the more so because there is a prospect of the French River navigation scheme being carried out.

A Mr. Peter, an American millionaire lumber merchant, who owns a large saw mill at Parry Sound and extensive limits in Ontario, as well as in the United States, has acquired a property in the Parry Sound district, and proposes to erect a large refinery and smelter if the Government will extend the Temiskaming and Northern Ontario Railway to Parry Sound. The Government has not announced its intention yet, but Lt.-Col. Matheson, the Provincial Treasurer, is about to proceed to Great Britain to make financial arrangements in connection with the railway, and it may be that provision for extension south as well as north will then be arranged for.

The Hon. Frank Cochrane, Minister of Lands and Mines for Ontario, has given his decision in the dispute between A. H. Beath and the Edison Company respecting the rights to certain nickel lands in Morgan Township, disallowing the claim of the latter. The claim was originally the property, by discovery, of H. Dick, who



transferred to the Edison Co. The regulations require payment within sixty days of one-fourth of the purchase money, and the balance within ninety days. This had not been done, and Mr. Beath, having understood that the property had reverted to the Crown, applied for it and obtained a lease. The Edison Co. put in their claim, holding that they should have received notice of forfeiture. The Hon. Mr. Cochrane holds that this is not required. He also decided against the system of blanketing. The decision, which is an important one, agrees with that formerly given by the Hon. J. J. Foy, and is generally approved of. Mr. Beath therefore retains the property.

## GENERAL MINING NEWS.

### NOVA SCOTIA.

The following companies will probably be amalgamated at Cheticamp: The Cheticamp Copper Co., the Inverness Mining Co., the Inverness Copper Co., and the Richfield Mining Co.

Active operations are about to commence on the iron areas at Torbrook, owned by Messrs. Brookfield and Corbitt, who have granted an option to a syndicate of Montreal and Toronto capitalists.

It is reported on seemingly good authority that the Dominion Iron & Steel Co. is contemplating the erection of several more open hearth furnaces. The present plant comprises ten furnaces, nine of which are in operation, but it is found that their output is not sufficient to supply all the steel required by the blooming mill and the rail and rod mills.

Several cars of fire clay, taken from the deposits recently bonded by Mr. Graham Fraser at Coxheath, are being tested in the Dominion Iron & Steel Co.'s blast furnaces. The clay was loaded on to the cars at Sydney River siding, having been hauled from Coxheath in carts. It is said that Mr. Fraser has bonded the farm on which the deposits are located for \$12,000.—Sydney Mines Star.

The Dominion Iron & Steel Company recently completed the new plant at Wabana, Belle Isle, Newfoundland, providing for increased haulage and shipping facilities. The output at Wabana during July was the largest in the history of these mines, 75,000 tons of ore having been mined and shipped during this period. Meanwhile operations are being made to extend the development of the company's property. It may here be noted that this company has contracted to supply immediately to the Dominion Government 25,000 tons of 80-lbs. steel rails for use on the I. C. R.

Advices from Wabana state that excellent progress is also being made at the company's iron mines, where the output has been far in excess of that of former seasons. The company are now mining 1,200 tons a day, besides using the bank which was piled last winter. Of this, about 20,000 tons have been shipped to North Sydney for use at the blast furnaces at Sydney Mines, the balance being sent to Rotterdam, six large steamers being constantly employed in this trade. The company's output has been doubled since the instalment of the new mechanical device at the plant. Shipments for winter use at Sydney Mines commenced on September 1st.

The Mines Exhibit at the Provincial Exhibition, which promises to be an exceptionally interesting one, will be housed in a new building. The Nova Scotia Government will have a large display and in the centre of the building will be exhibits by the Dominion Iron and Steel Company, Nova Scotia Steel and Coal Company (showing both steel and coal), Londonderry Iron Company, the Montreal Pipe Foundry Company, Dominion Coal Company, Intercolonial Coal Mining Company, Acadia Coal Company, Dominion Tar and Chemical Company, Sydney Cement Company, Sydney Coal Company, Cumberland Coal and Railway Company. The dimensions of the mines building are 40 x 80 feet.

The Nova Scotia Steel & Coal Co.'s open hearth plant consists of a battery of three furnaces each with a capacity of forty tons. Provisions have been made for the installation of two additional furnaces, the whole plant, comprising, apart from the furnaces, a fifty-ton mixer, a ladle drying apparatus, gas producing battery, electric cranes, and such accessories, was erected by the company's own employees, and is of the most modern type obtainable. The blast furnace has a capacity of 180 tons, but its entire product will now be utilized in the manufacture of steel. Its type is similar to that of the furnaces of the Dominion Steel Co. The coke plant comprises 150 ovens. This plant is conveniently located near the furnaces as well as are the electric power-house and different shops.

### QUEBEC.

Messrs. Curtney & Brown, of Ottawa, creditors of the Anglo-Canadian Graphite Syndicate, Ltd., are petitioning for a winding-up order, and in consequence the sale of the Company's property advertised was postponed.

Much interest is taken in a reported discovery of natural gas at Yamachiche, where boring for oil is in progress under the auspices of two different companies. A flow of gas started in one well when drills had reached a depth of 280 feet. Natural gas is used for fuel at St. Genevieve, in this district.

### ONTARIO.

The Wabigoon "Star" reports that a cyanide plant has been installed at the Redeemer mine.

During August, the office at the Laurentian mine, Gold Rock, was destroyed by fire, the loss being estimated at \$4,000.

The Lake Superior Corporation is again opening up the Josephine iron mines at Michipicoten, under the direction of Prof. A. B. Wilmott.

At the Massey mine about 35 tons of  $4\frac{1}{2}$  per cent. copper is being treated by the Elmore plant every 24 hours. The mill is producing from  $7\frac{1}{2}$  to 8 tons of concentrates daily, averaging 21 per cent. of copper.

The Coleman & Bucke Consolidated Cobalt-Silver Mining Co., Limited, and the Windsor and Cobalt Mining Co., with capitals of, respectively, \$1,150,000, were incorporated during August to operate in the Temiskaming mining division.

The Government diamond drills are now being employed, one on the iron ore outcroppings in Temagami, the property of Mr. T. B. Caldwell, M.P. and others; drilling is also in progress at Port Colborne on a limestone property.

The Sickerton Oil Company, drilling in Moore Township, near the River St. Clair, recently struck a good flow of oil. This is the second oil well sunk in this new district. It is estimated that the flow is equal to 40 barrels a day.

Work is progressing satisfactorily on the installation of the new plant of the International Graphite Co., at Niagara Falls, and it is expected that operations will be commenced this autumn. As artificial or manufactured graphite is meeting with a very large sale, and the foreign market can be supplied from this new Canadian plant, the prospects of the business are exceedingly good.

At the Big Master mine, in the Manitou district, good progress is being made with development, while the aerial tramway conveying the ore from the shaft to the mill is being put in working order. A new discovery is reported to have been made on the property of the Gold Rock Mining and Milling Co., the ore outcropping near Selby Lake.

One of the questions awaiting settlement on the return of the ministers now absent in the Temagami district is the opening of the forest reserves and timber limits for mineral prospecting. The miners as a body are opposed to the imposition of any royalty on lands already opened or held, but suggest that new districts might be opened up and offered to the public on a royalty basis.



The Petrolia Advertiser states that the territory discovered in Moore Township last year was regarded somewhat sceptically by experience operators, but it has since proved very promising. The extent of the oil deposits is not by any means defined, and there is every reason for asserting that oil will be got over a very wide area. The strike near Mooretown, within three miles of the river, must have the effect of stimulating the drilling. The large production of some of the Leamington wells was a strong magnet, and the Detroit papers in particular do much to boom that territory, but the expenses of operating in Moore are so much lighter that it should be found equally as attractive now that its staying powers have been so fully proved.

It is reported that the Carborundum Co., at Niagara Falls, will rebuild the plant which was destroyed by fire some time ago at Niagara Falls, in Canada. Carborundum has grown to be one of the most popular abrasives. With the exception of one year, 1902, there has been a continuous increase from year to year in the production and use of carborundum. In that year the decrease was due to a scarcity of supplies used in the manufacture. Last year the total production was 7,060,380 pounds, which was an increase of 2,300,490 pounds over 1903, when the production was 4,759,890 pounds. To have Ontario once more take part in the manufacture and in supplying the market with such a popular product of the electric furnace will be good industrial progress.

The Petrolia Advertiser makes the following pertinent comment:—"There are those who show a disposition to croak and belittle the chances of striking oil in any new quarters out of the ordinary, and it is this class of people who do a community like ours harm. The nature of the oil business is such as to require the advent of new operators constantly to liven matters up and keep up the search actively, and we have heard it said that there are croakers in these parts who do much harm in discouraging those who otherwise would take a hand in the business. In slang parlance they are called 'knockers,' because of the peculiar satisfaction they seem to take out of the practice of knocking the enthusiasm and optimism out of the newcomer. The business is one possessing the element of chance in a high degree, but every passing year demonstrates that there is virgin territory awaiting the work of the operator, and whenever he appears and wants to try his luck he should not be unnecessarily discouraged."

The Copper Mining and Smelting Company of Ontario was incorporated during August with a capital of a million dollars, the following provisional directors being appointed:—Messrs. T. Hayes Sheen and J. Carnegie Williams, of England; R. A. Lyon and F. M. Perry, of Toronto; and J. McPhail, of Sault Ste. Marie. A meeting was immediately held for the purpose of arranging for the transfer of the Bruce Copper Mines, Ltd., to the newly formed company. No stock will be issued in America, as it has all been taken up in England, and the syndicate has decided not to take advantage of the right to issue stock at a discount, as allowed by the Ontario Mining Company's Incorporation Act. An advisory board will be formed in Toronto representing the various interests concerned in the successful operation of the company, who will from time to time advise with the officers and staff in Toronto and the directors in London. The mines have a fairly complete equipment for the handling of 500 tons per day; meanwhile development work will be at once resumed under the charge of the mining engineer, Mr. Williams. The ore is of a higher grade than that usually found on the north shore. The mines were discovered in 1846, and worked until 1876 by the John Taylor Co., of London, and for a number of years paid satisfactory dividends until the decline in the price of copper.

#### ALBERTA.

Rapid progress is being made in the construction of the new smelter plant of the Canadian Metals Company, at Frank. The walls of the furnace and main buildings are completed, and the carpenters are placing on the roof.

The boilers and most of the machinery for the powerhouse have arrived, and will be placed in position at once, in order to have them running when the plant is completed. The electric building will be ready for the dynamos by the last of this week. It is the intention of the management to have the plant in running order within a month's time.

A London, Eng., report states that authority has been granted to the Western Canada Cement & Coal Co. to receive applications for £225,000 first-mortgage bonds at par, to be applied in acquiring cement, clay and anthracite coal lands at Kananaski, Alberta, in erecting a Portland cement factory, and for working capital. They besides contemplate the building of 300 to 500 elevators throughout the Northwest, with the latest appliances. Their capital will be \$10,000,000 to \$12,000,000.

#### BRITISH COLUMBIA.

**Coast.**—The seventy concentrating tables in the concentrator building at the Britannia mines were given a thorough test on the 28th of August, the results being most satisfactory. The Australian "jig," a concentrating machine of a new type in this country but long used successfully at the Broken Hill mines in Australia, passed through the test in a most satisfactory manner. The capacity of this appliance is three hundred and fifty tons per day.

In addition to the Copper Queen Mine, which is about to be re-opened by Mr. H. Wilde, M.E., of New York, development operations have been resumed on the Loyal; meanwhile the Marble Bay is making regular shipments to the Tacoma smelter.

Mr. W. F. Borland, of Montreal, recently concluded negotiations in Victoria for the purchase of an extensive coal property on Graham Island of the Queen Charlotte group.

Mr. Robinson, managing director of the Britannia Copper Mines, has recently secured an option on the Mount Andrews mineral properties on Prince of Wales Island. The ore is said to be red hematite, carrying copper and gold in relatively small values, but the ores are likely to be useful for fluxing purposes in the treatment of the Britannia ores at Crofton.

**Similkameen.**—The B.C. Copper Company recently purchased the Apex group of claims, at the head of Keremeos and 16 Mile Creek in this district.

Prospecting has lately been active on One and Five-Mile Creeks, Similkameen. Twenty miles up One-Mile a new strike of gold-bearing rock has been made, and at Five-Mile the Gladstone claim, recently located, has a vein over eight feet wide without either wall being encountered so far, which assays 16.6 per cent. copper and whose total values are \$47.86.

**Cariboo.**—The Forest Rose Mining Company, owning bench claims and leases on Williams Creek near Barkerville, is being reorganized. The properties have been worked almost continuously since 1864, and have produced over a million and a half dollars in gold. The company declared a dividend this year. The present equipment of the property consists of a 7-inch hydraulic plant and a No. 1 Giant. The Vancouver investors, who are securing the controlling interest, propose equipping the property with a modern hydraulic plant, in readiness for operations next season.

**Atlin.**—Promising new placer discoveries are reported to have been made in this district on a creek which has been named Lincoln. At a depth of three feet on the discovery claim panning yields from 3 to 4 cents. Bed-rock, it is expected, will be found at a depth of about 20 feet. The creek is situated some 45 miles in a northeasterly direction from Atlin.

The dredge of the Northern Mines, Ltd., on Spruce Creek and the Switzer dredge on Gold Run are both operating with good results, and it is expected that dredging at Blue Canyon, on Spruce, will be started this autumn. Water is plentiful on Pine, Spruce and McKee, but scarce at Birch, and on Boulder. Not only is hydraulic mining

active but there is considerable activity in quartz mining. Many prospectors are doing assessment work, waiting for the enlistment of capital, and their properties are showing up encouragingly.

**Lardeau.**—A promising strike is reported to have been made on the Crescent, one of the claims of the Mammoth group, in this district, a cross-cut in No. 1 tunnel having exposed 18 inches of exceptionally high grade ore, from which a return of 2,446 oz. of silver was obtained. The Sirdar claim is also showing well. The ore shipped from this property during the winter averaged \$100 to the ton.

The annual general meeting of the Great Northern Mines, Limited, was held at Nelson during August. The following directors were elected: Messrs. W. F. Cochrane, W. B. Pool, W. E. Gosnell, B. Crilly, W. A. Jowett, R. G. Matthews, and F. W. Godsall. Mr. R. Hodge was appointed secretary of the company. In consequence of a change of plant the proposal to promote a subsidiary company to operate the Swede and Lucky Jack claims has been abandoned. Meanwhile, the promoters of this company have offered to relinquish all claim to the shares issued to them over and above the actual cash paid by them for the properties, in shares of 30 cents each, provided such shares are sold and the proceeds used to pay the debts of the company. The shareholders present at the meeting last week have decided to pool all outstanding shares until October 1st, 1906, and request all holders of stock to join in the pool and send in their certificates to the company's secretary.

Developments of the Silver Cup at Ferguson seem to be affording most satisfactory results, another promising strike having recently been made which is said to have uncovered the richest ore ever found on the property, assays giving 300 ozs. in silver and 70 per cent. lead. This find was made at a depth of 700 feet.

**Boundary District.**—In an interview with the Phoenix Pioneer, Mr. Sam'l Newhouse, managing director of the Dominion Copper Company, Limited, is reported to have said that the company anticipates erecting a new smelter in the Boundary district in the near future, as the plant at Boundary Falls, recently acquired from the Montreal & Boston Co., is not capable of being economically operated. Mr. Newhouse stated that the location of the new works has not yet been decided, but that probably Greenwood or Midway will be selected. Systematic development work has meanwhile been resumed at the Brooklyn, Stewindler and Rawhide mines, and the company hope ere long to maintain a daily output of 1,000 tons.

A plant, consisting of boiler, hoist and steam drills, has been installed at Helen mine, near Greenwood, and a new two-compartment shaft is being sunk on the property. A new compressor plant is also being installed at the Providence, which is making regular shipments of high-grade oil.

By the recent purchase of adjoining properties, the area of the Granby Co.'s holding at Phoenix has been approximately quadrupled. These properties include the Gold Drop, Gold Drop Addition Fraction, Phillipsburg and Nugget. The properties have been optioned for some months at \$250,000, during which period explorations were carried on by diamond drilling, which are said to have disclosed deposits similar to those already developed on the Knob Hill and Old Ironsides. The company has also bought from the prospectors, Vaughan and McInnes, the No. 13 claim, which is situated between the Granby and Gold Drop groups, for \$14,000.

The British Columbia Copper Co. recently bonded another promising copper prospect on Copper Mountain, east of Cheshaw, Wash. The group includes a number of claims which will be developed under the superintendence of Mr. Harry Johns, who has been identified with mining in the Boundary district for several years past.

It is stated that the new three-compartment shaft at the Granby mines will be completed in about six months, in time for the installation of the extensive head works equipment, for which specifications are now being prepared and tenders invited. Meanwhile the exploration of the 400-foot level is steadily going on with crosscuts and

drifts, and the winze from the 300-foot to the 400-foot level is also being steadily sunk to the 500-foot level, some distance of this incline being already attained.

**Rossland.**—Arrangements are being made to resume operations at the O. K., the owner, Mr. Jno. Harryman, of Baltimore, having recently visited Rossland with this end in view. The mine is entitled to 100 inches of water in Little Sheep Creek, which is more than the flow during four months of the year. Little Sheep Creek is the main source of the water supply of the Le Roi, Le Roi No. 2, White Bear and Jumbo mines, and consequently, should the O. K. resume operations on a large scale, it is feared more important property will be seriously inconvenienced.

Last month the Cascade Bonanza mines joined the productive class after a lengthy suspension of operations. The properties are now owned by a Philadelphia syndicate.

The lessee of the Crown Point mine has already commenced the shipment of ore from this property.

At a special meeting of the board of directors of the Le Roi Mining Company, held on September 5th, a contract was arranged by which the entire shipping product of the Le Roi mine will be sent to the smelter of the Canadian Smelting Works at Trail.

The Le Roi Company's concentrating mill was closed down during August to admit of the installation of additional machinery, including a set of larger rolls and a Chilean mill.

An extraordinary meeting of the Spitzee Gold Mines, Ltd., was held at Rossland recently to consider the question of levying an assessment of \$1.50 per share to provide funds for the prosecution of systematic development work at the property. The proposal was agreed to on the understanding that no call be made for more than 25 cents per share quarterly. The annual general meeting of the company was held in Rossland on September 7th.

**Nelson.**—The erection of a concentrator at the Molly Gibson mine, Kokanee Creek, is now contemplated. Prospects at the mine are said to be exceedingly promising.

Shipments are being increased from the Hunter V. mine to the Hall smelter. It is stated that the grade of ore shipped is higher than heretofore, a body of ore carrying high values in silver having recently been opened up.

The Queen mine recently purchased by Mr. W. Waldie for \$50,000, was last month bonded to Messrs. Doyle Bros., of Chicago, for double that sum.

A great deal of damage is being done in the Ymir district by bush fires. At the Dundee mine, the buildings, including the boarding-house, tables, shaft-house and boiler house, were destroyed, while the timbers in the tunnel and shaft of the Yankee Girl were burned through, which resulted in the ground caving in. In addition, of course, much valuable timber was destroyed, and several miles of corduroy.

The Hastings Exploration Syndicate recently declared a dividend of \$15,000, and in celebration of this event the manager, Mr. Leslie Hill, offered the men employed at the Arlington mine a holiday of two days and a half, with full pay, in order to allow them to visit the Nelson Fair. Those, however, who did not wish to attend the fair were allowed to continue work and receive two and a half days' extra pay.

**Slocan.**—The richest strike of silver ever made in British Columbia is reported to have been encountered at the Ottawa mine. This ore body averages from 3 to 5 feet in width, and the lowest assay return obtained gave 1,600 ozs. to the ton, while others ran as high as 7,480 ozs. The ore is native silver and high-grade sulphide, and was encountered in the No. 5 tunnel.

Another strike is reported to have been made in No. 3 tunnel on the Payne, an ore body assaying 120 ozs. in silver and 65 per cent. lead having been encountered.

The mill at the Jackson mine is now working two shifts and producing 15 tons of zinc concentrates per day. Here, as in the district generally, some difficulty is being experienced on account of water shortage, consequent upon the dry summer.



Two new zinc separators were received at the Kootenay Ore Company's works last month, and are to be installed immediately. These machines were manufactured by the Ding and Electric Zinc Separator Co. of Milwaukee. Shipments of zinc ore will shortly be made to these sampling works by the Jackson and Ruth mines.

Mr. John Keen of Kaslo, acting as agent for a client, purchased last month from the lessees their lease of the Bell Mine in Jackson Basin, afterwards purchasing the property outright from the owners for \$10,000. The property is said to be an exceptionally promising one, containing a good showing of silver, lead and zinc ores.

The Slocan Star continues to make a heavy production of zinc, which recently averaged about 630 tons per month. This ore carries 35 per cent. in zinc and 45 oz. silver. The mill is being operated with double shift.

The California mine, near New Denver, has been acquired by a German syndicate on a working bond covering a period of 16 months. The properties will be operated under the direction of Mr. W. Brenner, in conjunction with the adjacent Molly Hughes group.

**East Kootenay.**—The output from the Sullivan mine now averages about 140 tons per day, while the mine is also being systematically developed. At the North Star, in this section, prospecting work is now in progress. Shipments from the St. Eugene mine in July aggregated 2,700 tons of concentrates, from which were produced 1,060,072 pounds of lead. The new compressor plant has been successfully installed at the mine, and additional machine drills will shortly be operated. At the Lake Shore the shaft has been sunk to a further distance of 100 feet, and an extensive programme for developing the property is planned.

A group of copper claims, situated north of St. Mary's Lake, known as the Uncle Sam and High Peak, are being extensively developed, and promise well. The vein is said to have an average width of 12 feet, while copper values run from 11 to 38 per cent.

There are said to be some six properties in the Windermere district from which shipments will be made this season. At the "Paradise" development work is in active progress, while at the "Ptarmigan" active operations will be commenced as soon as transportation facilities, which, it is expected, will be afforded by the construction of the Kootenay Central Railway, shall have been provided.

A second stack was blown in last month at the Sullivan smelter at Marysville, thus affording these works a capacity equal to any at present in operation in the Kootenays.

#### YUKON.

The whole of the Yukon district has felt the scarcity of water this season very severely, and in consequence the gold production is expected to be less than last year. Last month there was one or two heavy rainfalls that assisted matters to some extent, but not sufficiently so to materially affect the outlook. On Gold Bottom there has been much activity recently.

On Dominion Creek many of the operators are using petroleum engines, which appear to be giving very good satisfaction, chiefly as they give less trouble than steam or gasoline, and in the Yukon at least, are found to be more economical, a 10 h.p. engine consuming 15 gallons of oil in 12 hours.

The Conrad Company, at White Horse, is now preparing to construct an aerial tramway at its property at Little Windy Arm. The company has also purchased a group of 14 additional claims, on some of which the surface showings are said to be promising.

#### THE TROUBLES OF A BRITISH COLUMBIA DREDGING COMPANY.

Legal action has been commenced by some of the shareholders of the Iowa-Lillooet Gold Mining Co. to obtain possession of the assets consisting of dredging leases and a dredge which have been taken over by the mortgagees. The company was formed by Iowa promoters some three or four years ago, and incorporated under the laws of the

Province, with a capital subscribed of \$125,000. The dredge at first was not successfully operated, and at considerable cost was remodelled. In consequence, the company became involved and was obliged to give a mortgage of \$10,000 to the manufacturers of the dredge. Later they got into the hands of a firm of eastern financiers, who took a second mortgage on the property of \$12,000, and then, acquiring the first, proceeded to seize the property. While there is nothing apparently unusual or suspicious in this procedure, some of the shareholders allege that they have secured evidence to prove that the eastern financial firm in question has merely acted in the matter as the agents for other shareholders in the undertaking who have taken these steps to buy in the property at a very cheap rate, and "freeze out" others jointly interested. Application has meanwhile been made for a winding-up order, which has been granted.

#### COAL MINING NOTES.

##### NOVA SCOTIA.

Coal production statistics for the first six months of the current year, from Nova Scotia, show a slight falling off as compared with the returns of the corresponding period of 1904, thus: the Dominion Coal Company shipped 1,156,586 tons, as against 1,218,525 tons; Cumberland Railway and Coal Company, 187,675 tons, as against 204,543 tons; Nova Scotia Steel and Coal Company, 106,653 tons, as against 206,376 tons; Inverness Railway and Coal Company, 74,669 tons, as against 56,081 tons; Intercolonial Coal Company, 121,368 tons, as against 88,089 tons; and Acadia Coal Company, 115,291 tons, as against 123,097 tons.

It is expected that the Nova Scotia Steel & Coal Co.'s output for 1905 will be a record achievement. Coal, meanwhile, will be taken, it is thought from the new collieries in a few weeks' time. During August a contract was made with the Montreal Sugar Refinery for 25,000 tons of picked coal as a first consignment.

Shipments from the Cumberland Railway & Coal Co.'s collieries for the month of August were 39,208 tons.

On August 28th a fire broke out at the Dominion Coal Co.'s washing plant, near Port Morien, and before it was extinguished damage to the extent of about \$5,000 had been sustained.

Mr. James Ross, president of the Dominion Coal Co., recently made a detailed inspection of the collieries, in consequence of which it was decided to abandon the south slope in the Dominion No. 6 Colliery, and to operate the Emery seam. The latter mine will be worked on the "long wall" system, which may be very largely adopted in the future working of the collieries. Sinking at Donkinsville to tap the seam was commenced on August 31st, the Emery at this point underlying the Phalen seam at a depth of about 135 feet. The recent resumption of mining on this seam at Reserve also points to the fact that the company intend a vigorous prosecution of the work. The Emery is more variable than the Phalen, running from something over three feet in thickness up to ten feet in the old workings near No. 6 Colliery. The new shaft is being sunk near the north slope of No. 6, and work will be actively prosecuted.

##### BRITISH COLUMBIA.

Experiments have been recently conducted in Victoria by Prof. T. S. C. Lowe, of California, to ascertain the value of Vancouver Island coal in connection with a new coking process. Prof. Lowe, it is said, is interested in securing a steady supply of coke for use in California smelting and other industries.

A strike which was threatened at the Crow's Nest Pass Coal Co.'s collieries during August was settled by the general superintendent, Mr. Drinnan, in the absence of the general manager, Mr. Lindsay, acceding to the men's demands, which, however, must be confirmed by Mr. Lindsay upon his return. The terms agreed upon were as follows:—



1. That \$3 be paid for the moving of the McGinty and its setting up as at present in use in the Coal Creek mines, with the exception of what is known as the "jig" in use at the Michel colliery, for the moving and setting up of which \$1.50 is to be allowed, and all payments which have been made for the first mentioned McGinty at the rate of \$1.50, to be made up to \$3 from the signing of the original agreement.

2. That blacksmiths (as claimed to be such by the union) be paid at the rate of \$3.50 per day, and all back pay deficient in this respect be made good.

3. That car repairers be paid at the rate of \$3 per day and all deficiencies in back pay be made up.

4. That the tippie engineer at Michel be paid at the rate of \$3 per diem and all deficiencies in back pay be made up.

5. That the erection of cogs be paid according to the length of the timber used in their construction; \$1 for three feet, and 33 1-3 cents per foot for length over that, and back pay made up.

Col. Spear, described as a wealthy coal operator of New York State, has bonded eight sections of coal and oil lands in Southeast Kootenay, immediately north of the Montana boundary, near Sage Creek. It is said that Col. Spear proposes forming a company in Montreal to exploit this property.

The Wellington Colliery Company have commenced the erection of new machine and car shops at Union Bay, Vancouver Island. The main building, which is to be 80 feet square, will be fitted up with up-to-date machinery for repairing locomotives and cars.

Residents of Rossland who are interested in coal and oil licenses in East Kootenay have prepared and signed the following memorial to the chief Commissioner of Lands and Works: We, the undersigned, prospectors and locators of coal and oil claims in south East Kootenay, in that portion thereof known as block 4593, hereby demand that licenses to prospect for coal and oil on the lands respectively located by us for the ensuing year in the ordinary form and not in the form in which certain documents, purporting to be licenses, but which from the decision of Mr. Justice Martin it would seem were not really licenses at all, were issued from your department. And whereas it appears that the issuance of the so-called licenses was ultra vires, we therefore claim that you hold as trustee for us the sum or sums which we have respectively paid to you to cover the fees necessary to procure a license to prospect for coal and oil on the said lands during the last 12 months. And whereas the claims, in respect whereof we demand licenses, were staked by us under the act in force at the time we made our respective locations, the fee payable under the said act being \$50. And whereas the amendment to the said act making the fee for prospecting licenses for coal and oil \$100 in lieu of \$50 was not made retrospective since the passing thereof, We, the undersigned, therefore demand, in addition to licenses for the ensuing 12 months, that you return to us the sum of \$50 per claim paid to you by us in excess of the fee you were legally able to charge, or in the alternative, an undertaking from you to apply the said sum of \$50 per claim in satisfaction of fees for further renewals of the licenses hereby applied for. And further, in view of the statement made by the Hon. R. McBride whilst here some time since, we quite recognize the futility of attempting to proceed against the government, and therefore have decided to contest the title of any person or persons who may stake over the ground for which we claim licenses, and we request that, if possible, you make this a matter of record on your books, by way of caveat.

The output of the Crow's Nest Pass Coal company's mines for the month of July was as follows:

|            |           |
|------------|-----------|
| Coal Creek | 40,260.06 |
| Michel     | 23,745.15 |
| Carbonado  | 9,028.01  |

Total 73,033.22

## ALBERTA.

The West Canadian Collieries Company, near Lille, are now shipping from the No. 1 Colliery some 600 tons of coal daily. The construction of the new tippie was recently completed, and it is said to be one of the largest and best arranged in the district, and capable of handling 2,000 tons a day. The company is now building near the coke ovens a large coal washer. Coke is being manufactured in ovens of the Belgium type, and a daily production of rather over 100 tons is being maintained.

Plans for the proposed new tippie for the Canadian-American Coal & Coke Co.'s colliery at Frank have been completed, and tenders are invited thereon. In addition to the tippie, the box-car loader is about to be installed at these mines.

The West Canadian Collieries mine at Bellevue is now producing over 200 tons of coal per day, and is gradually becoming one of the most important producing collieries in the province.

## YUKON.

Three Yukon coal mines are now producing regularly, and two or three others may be opened soon. One of the largest producers is at Coal Creek, and is served by twelve miles of railway, on which the coal is hauled to the Yukon, a few miles below Forty-Mile, and there transferred by boats for Dawson. The Dawson Electric Light and Power Company consumes the greater part of this coal. On the Upper River the Tantalus mine is the most important producing property, most of whose output is consumed by the White Pass Railway on the river steamers. Several promising coal seams have also been located near by. Preparations are being made by a syndicate to open coal properties on Roy Creek below Forty-Mile, where some excellent coal is said to have been found, and for some time past a mine has been worked at State Creek, and the product shipped to Dawson for local requirements.

## COMPANY MEETINGS.

**The Cariboo Consolidated, Ltd.**—A meeting of the shareholders of this company was held in London last month. The chairman, Sir James Bevan Edwards, said that considerable progress had been made in the development of the company's Lightning Creek property. A cablegram had been received from one of the directors at present visiting the mine, conveying certain recommendations for the future and when these were carried out the mine would become dividend-paying.

**Britannia Copper Syndicate, Limited (B.C.)**—A meeting of this syndicate was held in Vancouver, on August 14th, when the following resolutions to increase the capital stock of the company were unanimously carried:—

That the capital of the company be increased to \$937,500 by the creation of 1,000 additional ordinary shares of \$312.50 each, ranking for dividend and in all other respects *pari passu* with the existing ordinary shares of the company when and so soon as such existing shares have been subdivided into shares of \$312.50 each.

That the directors be and they are hereby authorized to enter into an agreement with Henry Stern, of New York, for the underwriting of 884 of such new shares at *par*, viz.:—\$312.50, subject to a commission of 10 per cent. in cash upon all shares unsubscribed for by the shareholders, provided the said Henry Stern will have the opportunity of subscribing for additional shares at *par* to the amount of such cash commission, and provided that notwithstanding such agreement and as a term thereof, the said 884 new shares shall be first offered to the members at *par* in the proportion to the existing shares of \$625 held by them, such offer to be open for a period of twenty days from the date of such offer.

The chairman, the Hon. E. Dewdney, referring to the position of affairs at the mine, said that the plant is now



practically complete, the tramway being in working order, while some 2,000 tons of ore are now in the bins, a daily output of 100 tons a day being maintained from the mine. It is proposed to enlarge the Crofton smelter to treat 1,000 tons daily, and reverberatory furnaces and Edwards roasters would be added to the plant. In addition, the Anaconda type of briquetting machine for handling the fine concentrates was about to be installed. It is expected that the plant will be in readiness to commence operations early in October; meanwhile Mr. Geo. H. Robinson, managing director, has succeeded in securing the tonnage of the Mount Andrews group of mines, Prince of Wales Island, for this smelter.

#### Hastings (British Columbia) Exploration Syndicate.—

The directors, in submitting the seventh annual statement of accounts, for the year ending May 31st, 1905, show a balance of cash on hand of £6,572, 19s. 1d. The ore shipped to smelters realized £10,099, 16s. 10d. net after the deduction of freight and treatment. No account has been taken of the value of the ore in bin at the mine. The board has recommended the distribution of a dividend at the rate of 5 per cent., which was payable on the 5th of August.

Following are extracts of the report of Mr. Leslie Hill, the company's local representative and consulting engineer:—

**"Arlington Mine.**—During the year 1,688 feet of development work was done, consisting of drifts, cross-cuts, raises and winzes, the total cost of which for labour was \$10,324.11, equal to \$6.12 per foot, which compares favourably with previous years.

"During the year 1903-04, I followed up a small streak of high-grade ore which had been exposed above the No. 1 or Main Tunnel, and which assayed well, but was considered too small to work. This streak enlarged and spread, and finally developed most of the ore which was shipped during this year. This new ore body extended to within 5 feet of the ore previously mined in the large stope known as the 'Bull-pen,' and was only separated from it by a thin layer of barren slate.

"During the year returns were received from the smelter on 1,128.75 tons of ore, the gross value of the contents being \$66,140.00, and the net smelter returns, after deducting the cost of freight and treatment, and the usual smelter deductions, \$52,700.57. The average gross value was \$58.60 per ton, and the average net smelter value, \$46.70. 112 tons of this ore shipped were taken from the head Arlington workings, the average net smelter value of this ore being \$59.33 per ton, and 1,016 tons were from the Arlington workings, the average net smelter value of which was \$45.30. These values were slightly higher than those obtained last year.

"In addition, a sum of \$1,200.12 was received from the Dominion Government as a bounty on the lead contents of the ore, making a total received from ore of \$53,900.69.

"The total cost of mining and hauling to Erie was \$34,746.08, leaving a gross profit of \$19,154.61, equal to 36.34 per cent. of the net smelter returns.

"The detailed mining costs per ton of sorted ore were as follows:—

|                                                                       | Per ton.      |
|-----------------------------------------------------------------------|---------------|
| Development (labour) .....                                            | \$ 9.15       |
| Stoping (labour) .....                                                | 9.04          |
| Sorting and tramming .....                                            | 3.98          |
| Timbering .....                                                       | .40           |
| Supplies .....                                                        | 2.25          |
| Surface and general expenses, including<br>assaying and surveys ..... | 1.93          |
| Hauling to Erie and loading on cars....                               | 2.77          |
| Ore tax .....                                                         | .87           |
| Insurance .....                                                       | .40           |
|                                                                       | <hr/> \$30.79 |

The cost per ton for development has been increased, owing to the greater amount of development necessitated by the opening up of fresh ground, and the cost per ton

for stoping is greater than that for the previous year, caused chiefly by the extra expense of stoping small high-grade sheets of ore in the Head Arlington. The total cost per ton of sorted ore is 20 cents higher than in the previous year; the average net smelter value, however, was greater by \$2.38 per ton, which is further increased by \$1.06 per ton lead bounty, making a total increase of value per ton of \$3.44.

"The total quantities of rock mined and of ore shipped would be in proportions of eleven to one, and the cost of mining, tramming, sorting and timbering, including supplies, would be \$2.25 per ton of rock mined.

"The above costs include all the expenses incurred at the mine, and in connection with mining and shipping, but do not include the expense of the Nelson office and of the general manager.

"The development of this new ground on the 770 feet north level is of very great importance to the future of the mine, as it opens up large possibilities. There is a large block of ground belonging to the company lying to the north of the present workings, and if the vein carries ore throughout the ground lying between the present stopes and the old Micawber workings, it will be seen that there is a large area of the vein to be developed. The ore shoots now exposed are narrow, but more continuous than in the portion of the vein already stoped. It is impossible to give any estimate of the quantity of ore in sight; the shoots are only exposed on one side, and also they generally turn out more ore in stoping than the exposed side would indicate, but there is more ore now exposed than at any previous time during my management, and there is a large block of ground in which it would be reasonable to expect development to find fresh ore shoots.

"The Head Arlington workings, while worked by the company, have turned out 112,113 tons of ore, which realized net smelter returns of \$6,652.00, and the total amount expended on these workings has been \$4,225.50. The vein as shown in these workings is very difficult to understand. The ore shoots have been dipping at a much greater angle than the regular dip of the vein. The streak of ore has usually been very narrow, but the ore has been high-grade. The ore shoot which we have been following has been stoped out, and I have not been able to connect it with the other vein worked by Muffett during his lease. From the present development it would appear that it is a spur or slip that we have been following, and in which we have found the ore shoots, and I believe that the main vein continues on the other side of the porphyry dyke which cut it off. I am in hopes that the seam which we are now following will prove to be the main vein."

With regard to the East Kootenay and other mineral claims, Mr. Hill advises as follows:—

"No work has been done during the year on your mineral claims in East Kootenay, or on the 'Sunlight' fraction mineral claim in the Slocan district. With regard to the claims in East Kootenay, I am informed that the North Star Mining Company is now doing development work on its claim called the 'Midnight.' This is the most northerly of their claims, and adjoins your claims 'Melton' fraction and 'Big Chief.' Some ore has been shipped from the 'Midnight' claim, and some float ore has been found in the wash on your claims, and any ore body developed in the 'Midnight' will increase the value of your claims. The smelter at Marysville is now in operation, and treating ore from the Sullivan group, which adjoins your property on the other side."

**Elk River Coal & Oil Company.**—The annual general meeting of the Elk River Coal & Oil Company was held in Fernie last month. The president, Mr. W. A. Bleasdel, presented a report of the directors, which showed the company to be in a strong financial position. The company own 45 coal claims in the Upper Elk Valley, which are now being developed. The following directors were elected for the ensuing year: Messrs. W. A. Bleasdel (president), J. R. Lawry (vice-president), Chas. Klingensmith, and W. S. Fairfield. The latter was re-elected secretary-treasurer.

## COMPANY NOTES.

**Tyee Copper.**—The report for July states:—"Smelter ran 11 days, and smelted Tyee ore, 1,793 tons; Customs ore, 262 tons—2,055 tons. Matte produced from same, 277 tons. Gross value of contents (copper, silver and gold) after deducting cost of refining and purchase of Customs ore, \$31,472."

**Ymir.**—The last report by cable to the London office, from the manager, states that conditions are generally improved on levels 5 and 7, where payable ore is being mined. 20 stamps ran 31 days, and crushed 1,700 tons (2,000 lbs.) of ore, producing 321 ozs. bullion. The estimated realizable value (gross) of the product is \$3,150. 153 tons of concentrates, shipped; gross estimated value, \$3,700. Cyanide plant treated 1,330 tons (2,000 lbs.) of tailings, producing bullion having estimated gross value of \$1,325. Sundry revenue, \$45—\$8,220. Working expenses, \$8,035; profit, \$185. There has been expended during month on development, \$2,942."

**Le Roi.**—Cable from Rossland:—"Shipped from the mine to Northport during the past month 8,575 tons of ore, containing 2,954 ozs. of gold, 2,885 ozs. of silver, and 174,000 lbs. of copper. Estimated profit on this ore after deducting cost of mining, smelting realization and depreciation, \$9,000. Expenditure on development work during the month, \$10,250. Shipped from the concentrator to Northport, 116 tons of concentrates of an estimated value of \$1,850."

**Le Roi No. 2.**—The mine manager cabled for July:—"Shipped 280 tons. The net receipts are \$4,294, being payment for 197 tons shipped, and \$2,213, being payment for 60 tons concentrates shipped. In all, \$6,507."

**Hastings Exploration.**—The report of the Hastings (British Columbia) Exploration Syndicate, Limited, for the year ended May 31st 1905, states that the balance of cash on hand at the bank in London and Nelson amounts to £6,573. Administration expenditure shows no material increase, but £461 more has been spent on development work, as compared with the previous year. The ore shipped to smelters realized £10,099 net—that is, after deduction of freight and treatment. No account has been taken of the value of the ore in bin at the mine. The directors recommend a dividend of 5 per cent., equal to 1s. per share.

Shipments and returns for the months of June and July from the Arlington mine were as follows:—

|            | Shipments. | Net Smelter Returns. | Expenses.  |
|------------|------------|----------------------|------------|
| June ..... | 118.8 tons | \$4,701.12           | \$4,249.27 |
| July ..... | 63.18 "    | 2,997.35             | 3,688.31   |
|            | 175. "     | \$7,698.47           | \$7,937.58 |

**Temiscamingue.**—The Temiscamingue Mining Co., Haileybury, Ont., has been incorporated with a capital of \$100,000, to carry on a mining, milling and reduction business. The provisional directors include: Messrs. C. A. Richardson, St. Catharines, Ont.; J. L. Wheeler, Emporium, Pa., and R. A. Cartwright, Brockport, Pa.

**Ontario Cobalt and Silver.**—The Ontario Cobalt & Silver Mining Co., Ottawa, has been incorporated with a capital of \$1,000,000, to carry on a mining, milling and reduction business. The provisional directors include the Hon. Louis Bedell, Goshen, N.Y.; and Messrs. W. A. Allan and J. T. Lewis, Ottawa.

**Detroit & Kent Co. Oil and Gas.**—The Detroit & Kent County Oil & Gas Co. of Ontario, Limited, a United States incorporation, has been licensed to produce oil, gas, etc., and to manufacture drilling machinery, etc., in Ontario, with a capital of \$40,000. Mr. William Jackson, Osborne P.O., Ont., is the company's attorney.

**Port Arthur Iron.**—The Port Arthur Iron Mines, Toronto, has been incorporated with a capital of \$500,000, to carry on a mining, milling, and reduction business. The provisional directors include Messrs. W. H. Moore, G. G. Ruel, and F. C. Annesley, Toronto.

**Buffalo.**—The Buffalo Mining Co., of Fort Erie, Ont., has been incorporated with a capital of \$500,000, to carry on a mining, milling and reduction business. The provisional directors include Messrs. C. L. Denison, R. W. Pomery and G. C. Miller, Buffalo, N.Y.

**Sucker Creek Gas and Oil.**—The Sucker Creek Gas and Oil Co., of Anderdon, Limited, Amherstburg, Ont., has been incorporated with a capital of \$250,000, to bore and drill for oil petroleum, natural gas, etc., and to carry on a mining, milling and reduction business. The provisional directors include Messrs. John G. Mullen, W. H. McEvoy, and J. A. Auld, Amherstburg.

## MINING AND INDUSTRIAL SHARE MARKET.

(Specially Reported by Messrs. Robert Meredith & Co., Montreal.)

There is very little change in the market for mining stocks since our last report. The low-priced shares are in demand, but it is impossible to procure any large amounts. The improved outlook has encouraged holders to wait for better prices, and it is only occasionally some few shares find their way into the market.

The encouraging reports from the large Rossland properties have created a demand for the shares of the contiguous smaller ones, but it is almost entirely local; for speculation at the mining centres appears to have completely died out.

Trading in industrials is limited, and quotations show very little change during the past month.

Quotations at September 6th were as follows:—

| Par value of shares. |                                  | Asked. | Bid.  |
|----------------------|----------------------------------|--------|-------|
| .10                  | Canadian Gold Fields Syndicate.. | .05    | .04   |
| 1.00                 | Centre Star..                    | .35    | .30   |
| 1.00                 | Deer Trail Consolidated ..       | .01½   | —     |
| 1.00                 | Giant..                          | .03½   | —     |
| 10.00                | Granby Consolidated ..           | 7.25   | 7.12  |
| 10.00                | Montreal and Boston ..           | —      | —     |
| 1.00                 | North Star..                     | .02    | —     |
| 1.00                 | Payne..                          | —      | .02   |
| 1.00                 | Rambler Cariboo..                | .20    | .15   |
| 1.00                 | Republic..                       | —      | —     |
| 1.00                 | St. Eugene..                     | .45    | .40   |
| 1.00                 | War Eagle..                      | .20    | .18   |
| 1.00                 | White Bear..                     | .04    | .02   |
| 100.00               | Nova Scotia Steel (common)..     | 63.00  | 62.75 |
| 100.00               | Ditto ditto (preferred)..        | —      | —     |
| 100.00               | Dominion Coal (common)..         | 79.00  | 78.00 |
| 100.00               | Ditto ditto (preferred)..        | —      | —     |
| 100.00               | Dominion Iron and Steel (com.).. | 23.00  | 22.00 |
| 100.00               | Ditto ditto ditto (pfd.)..       | 72.00  | 71.50 |
| —                    | Ditto ditto ditto (bonds)        | 85.00  | 84.00 |

## INDUSTRIAL AND MACHINERY NOTES.

The Handy Mining Co., Lardeau, B.C., contemplate installing additional plant at the mine in this district.

The directors of the Eva gold mines, operating at Camborne, B.C., propose installing an additional 10 stamps at the company's mill, subject to the approval of the shareholders, at the annual meeting, which will be held some time this month.

The five-drill compressor plant and other machinery belonging to the City of Spokane mine has been shipped to Ferguson, in the Lardeau, where it is to be used in driving a long tunnel under the Nettie L. mountain for the purpose of developing several properties owned by the Reward company. The City of Spokane mine was closed down in the early part of 1897, and since that



time it has remained idle. The Reward company recently acquired the plant, which is in excellent condition, considering that it has not been used for so long a time.

The Canada Foundry Company, Limited, received, last month, an order from the Western Fuel Co., of Nanaimo, B.C., for two 150 h.p. horizontal tubular boilers.

The equipment of the Betts and Hesperus mines was increased a short time ago by the addition of another power drill.

The Nova Scotia Steel & Coal Co., New Glasgow, N.S., have put in two of Barr's automatic spike machines, manufactured by the Smart-Turner Machine Co., Hamilton, Ont.

The Allis-Chalmers-Bullock, Limited, have introduced a change in the British Columbia branch, which heretofore has been in charge of the agency of the Canadian Fairbanks Co. Recently, however, Mr. G. C. Hinton, of the Hinton Electric Co., was appointed sales manager for British Columbia. Offices have been opened on Seymour Street, Vancouver, and here a complete stock of the Allis-Chalmers-Bullock products will be kept, including rock drills, and rock drill parts and electric and saw mill machinery. Mr. Hinton, though becoming local manager of Allis-Chalmers-Bullock, still retains an interest in the Hinton Electric Co.

Among the recent sales of the Allis-Chalmers-Bullock, Limited, Montreal, are a mining outfit to the Canada Metal Company, Ainsworth, B. C., including one 15 h.p. vertical boiler, one 40 h.p. vertical boiler, two No. 5 Cameron Sinker pumps, one 6¼ x 8 inch hoisting engine, one 7 x 10 hoisting engine, ore buckets, etc., and to the Souris Coal Mining Co., Bienfait, Assa., one 75 h.p. Lidgerwood hoisting engine of the combined friction drum and brake and reversible link motion type.

A hoisting engine of very heavy design has just been shipped to the Centennial Copper Co. from the Chicago works of the Sullivan Machinery Co. It is of the direct-acting type, and consists of two 36 x 60 inch simple, reversible Corliss engines of the heavy duty type, connected to a straight-faced drum, 15 feet in diameter by 15 feet winding face. The drum is grooved for 1¾ inch wire rope, and is keyed direct to the engine shaft. The plant is designed to hoist from a vertical depth of 5,000 feet at the rate of 4,000 feet per minute, with a boiler pressure of 150 pounds. The reverse engine is of novel design, and may be operated by either steam or air. The brake mechanism is arranged for steam, hand or gravity operation with independent control in each case. The main throttles are on the cylinders, moved by hand from the engineer's platform, which is elevated to a point higher than the drum. The dial indicators are provided with fast and slow moving pointers. A very sensitive and powerful automatic stop and throttle closing device is another important feature, diminishing the danger of over-winding with the high speed used. This hoist is complete in every detail, being equipped with the latest and most improved auxiliaries.

The plant, business and goodwill of M. Beatty & Sons have been purchased by M. Beatty & Sons, Limited. The new company will be under the same management and control, and continue the manufacture of the same lines of high-grade machinery as heretofore.

## DIGEST OF RECENT PATENTS—MINING AND METALLURGICAL.

Specially Reported for the Canadian Mining Review.

794,193.—Process of removing or recovering zinc from ores. William Stewart, Mount Florida, Glasgow, Scotland. A process consisting of pulverizing the ores, mixing therewith bisulphate of an alkali metal and common salt, furnacing at a red heat and thereafter lixiviating or leaching and precipitating the zinc salts.

794,555.—Ore Concentration. Hannibal Scovell, Harlie J. Scovell, Leslie E. Scovell and Wilsie E. Scovell, Galena, Kansas. The combination with a fluid-holding tank, shafts mounted in suitable bearings on said tank, and a set of cams secured on each of the said shafts, one cam near each end of each of said shafts, of a screen suspended in said tank, the forward end of said screen having a sharp upward curve, and the tail portion thereof being slightly upwardly inclined to permit an easy discharge of the waste matter from said screen, a suitable hanger secured to each side of said screen and supported on the cams of the shafts, a cam secured on one of said shafts, and a pitman, one end pivoted to the hangers and the other end provided with a strap adapted to embrace said cam, whereby, when a motion is imparted to the shaft the screen will be given a compound vertical and horizontal motion.

794,272.—Method of reducing Copper Mattes, white-metal and blister-copper in a single furnace. Ralph Baggaley, Pittsburg, Pa. A method which consists in producing a bath by melting matte-making material in such vessel or chamber producing thereby a low-grade matte, removing slag and adding to the molten bath from time to time ore in small quantities at a time, namely in less quantities than the molten bath, blowing air through the bath, and by the heat thereby developed fusing and fluxing such additions of ore.

794,274.—Dumping Mechanism for Cars. Anton Becker, Chicago, Ill., assignor to Joseph S. Ralston, Chicago, Ill. A car, in combination with load-retaining doors, a shaft adapted to be rotated to operate said doors, two ratchet-wheels upon said shaft, an operating-lever journaled upon said shaft between said ratchet-wheels, pawls on opposite sides of lever, each engaging one of said ratchet-wheels and a mechanical connection between pawls so that they move in unison.

794,255.—Electric Furnace. Cecil Saunders, Cleveland, O. The combination with a horizontal continuous trough forming a hearth, of means for continuously rotating the same, positive and negative electrodes supported on said hearth and adapted to convey current to and from the material thereon, stationary contact-pieces with which said electrodes make temporary contact and connections from said contact-pieces to the source of electricity.

794,876.—Ore or Rock Crusher. Edgar S. Moulten, Central City, Colo. The combination with a casing, of a buffer-block secured thereto, crushing-plates secured to said buffer-block, an eccentric-shaft journaled upon said casing, an oscillating jaw carried by said eccentric shaft, comprising a lever member, a plurality of crushing plates secured thereto upon one side thereof, a removable plate secured to said lever member upon the opposite side to which said plates are secured, a flexible member secured to said casing and connected with said lever member, a revoluble member engaging said plate carried by said lever member, and means for moving said revoluble member and retaining the same in an adjusted position.

795,193.—Treatment of Chromiferous Iron. Harry H. Campbell, Steelton, P. A method which consists in charging the same into a basic Bessemer converter, producing a basic slag, oxidizing the chromium by blowing air through the body of the metal, thereby causing the chromium to become part of the slag, and separating metal and slag.

- 795,007.—Briquetting Machine. Grant W. Rigby, Pittsburgh, Pa. The combination with a machine-frame, a crank-shaft, a reciprocating feed-box provided with mould-recesses therein, reciprocating plungers adapted to enter said mould-recesses, vertically-movable plungers with said feed-box, and means connected to said vertically-movable plungers and engaging with said crank-shaft for operating said vertically-movable plungers to feed and hold the material within said feed-box and between said mould-recesses and said reciprocating plungers to allow said reciprocating plungers to force said material into said mould recesses and compress the same.
- 795,258.—Gas Producer Apparatus. Carleton Ellis, New York, N.Y., assignor to Eldred Process Company, New York, N.Y., a corporation of New York. The combination of a gas-engine, a producer for supplying gas for the operation of the engine, a gas-passage connecting the producer with the engine, means for returning a portion of the products of combustion to the producer, means for cooling said products of combustion, means for admitting air to said producer, and means for the adjustment of the relative proportion of the products of combustion and air.
- 794,736.—Conveyer. Isaac Peabody, St Mary's Canada. A conveyer comprising a frame open at the top and bottom, and having tracks at the bottom of said frame, a series of horizontal brace-rods across the frame, sprocket-wheels on each of said rods, a driving-shaft mounted in adjustable bearings at one end of the frame, driving-sprockets on said shaft, and an endless carrier composed of a plurality of sprocket-chains adapted to co-operate with said sprockets, and spaced across-slats attached to the chains, a portion of said slats being provided with anti-friction-rollers which travel upon said tracks.
- 794,714.—Ore Grinder. Frederick J. Hoyt, Redlands, Cal. The combination with flanged and rotatable discs provided with sectors of radially-adjustable spring-cushioned grinding-faces, of opposed non-rotatable spring-cushioned and radially-adjustable grinding-faces.
- 795,294.—Fuel Briquet, and method of making same. Michael F. McGinnis, Philadelphia, Pa. A method which consists in providing a dry mixture of finely-powdered bituminous coal, plaster-of-paris, coal-ashes, salt, alum; preparing a solution consisting of molasses, water and meal, the residue of linseed-oil; and then combining the said dry mixture and solution and thoroughly mixing for a predetermined time, and then moulding into briquets.
- 795,275.—Process of Manufacturing Portland Cement from Slag. Carl von Forell, Hamburg, Germany, assignor to Henry Edmunds, London, England. A process which consists in forming briquets from a mixture of water-granulated furnace-slag and slag-meal, in roasting said briquets into a rotary-kiln in an oxidizing flame, in adding to said highly-heated slag small quantities of water, in disintegrating and projecting said heated slag against chilled surfaces, and in grinding said treated slag material.
- 795,770.—Coal-Loading Apparatus. John L. Howard, Oakland, Cal. In a coal-loading apparatus, a supply-trunk fitted in the vessel's hold, with its open top reaching to the hatch, said trunk having on one side a vertical series of independently-controllable discharge-gates, controlling the delivery of the coal from the whole of said side, and a controllable discharge-gate in its opposite side disposed as its upper portion to control the delivery from said side as required.
- 795,471.—Ore-Reducing Apparatus. William T. Armstrong, San Jose, Cal. In an apparatus, a tube of uniform diameter threaded at the ends, removable closures for said ends and rendering the tube substantially air-tight, said tube having an inner lining capable of being reduced to a carbonaceous form by heat, a condenser, and a pipe leading from the tube to the condenser, said tube adapted to contain a body of carbon-forming material mixed with ore, and said pipe having the end within the condenser provided with a check-valve to prevent backflow into the tube.
- 795,522.—Conveyer. Albert L. Laubenstein, Ashland, Pa. A conveyer-link comprising a pair of parallel bars, said bars having integral wings projecting from the edges thereof, said wings having laterally-disposed flanges projecting in opposite directions and transversely with respect to said bars, said flanges being in substantial alignment and affording means for attaching bucket.
- 795,923.—Ore-Feeder. Martin Nelson, Kalgoorlie, Western Australia, Australia. An ore-feeder comprising an ore-chute, a rotatively-mounted receiving-table located at the discharge end of said chute, guide-wings for said table secured to the discharge end of the chute and projecting outwardly therefrom abreast of said table, means for intermittently rotating said table, means for adjusting said table toward and away from said wings.
- 795,312.—Apparatus for the Reduction of Iron-Sand, Iron Oxide and other suitable substances. David R. S. Galbraith, Auckland, New Zealand, assignor of one-half to William Steuart, Auckland, New Zealand. An electrical furnace comprising a casement, a furnace-body arranged therein, resistances mounted within the furnace body, interceptors arranged in suitable relation to the resistances, carbon blocks mounted in the casement and projecting into the furnace-body, a cap mounted upon the furnace and provided with a feed-opening, a chambered casement supporting said furnace and first-mentioned casement, said supporting-casement provided with a gas-inlet and a pair of tap-openings, and a receiving vessel mounted in the chamber of the supporting-casement and provided with an inlet and a pair of discharge-openings registering, respectively, with a gas-inlet and tap-openings of the supporting casement.
- 796,338.—Pulverizing-Metals. Hudson Maxim, New York, N.Y. A process which consists in fusing the metal, atomizing the fused metal by the action of a highly-heated gas, cooling the atomized metal by the expansion of a refrigerant and collecting the metallic particles.
- 795,886.—Making Aluminium. Anson G. Betts, Troy, N.Y. A process which consists in electrolyzing a fused aluminium-depositing electrolyte of greater specific gravity than pure aluminium and of less specific gravity than the said aluminium-containing material used, with the alloy as anode, and a suitable cathode.
- 796,282.—Method of Converting Matte. Ralph Baggaicy, Pittsburgh, Pa. A method which consists in distributing a lining of unpacked silicious material over the working area of the interior of the converter, centreing the same in place, introducing matte into the converter, and blowing air there-through.



# PROVINCE OF QUEBEC

The attention of Miners and Capitalists in the United States  
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## GREAT MINERAL TERRITORY

Open for investment in the Province of Quebec.

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**The Mining Law gives absolute security to Title, and has been  
specially framed for the encouragement of Mining.**

Mining concessions are divided into three classes:—

1. In unsurveyed territory (a) the first class contains 400 acres, (b) the second, 200 acres, and (c) the third, 100 acres.

2. In surveyed townships the three classes respectively comprise one, two and four lots.

All lands supposed to contain mines or ores belonging to the Crown may be acquired from the Commissioner of Colonization and Mines (a) as a mining concession by purchase, or (b) be occupied and worked under a mining license.

No sale of mining concessions containing more than 400 acres in superficies can be made by the Commissioner to the same person. The Governor-in-Council may, however, grant a larger extent of territory up to 1,000 acres under special circumstances.

The rates charged and to be paid in full at the time of the purchase are \$5 and \$10 per acre for mining lands containing the superior metals\*; the first named price being for lands situated more than 12 miles and the last named for lands situated less than 12 miles from the railway.

If containing the inferior metal, \$2 and \$4 according to distance from railway.

Unless stipulated to the contrary in the letters patent in concessions for the mining of superior metals, the purchaser has the right to mine for all metals found therein; in concessions for the mining of the inferior metals, those only may be mined for.

\*The superior metals include the ores of gold, silver, lead, copper, nickel, graphite, asbestos, mica, and phosphate of lime. The words inferior metals include all other minerals, and ores.

Mining lands are sold on the express condition that the purchaser shall commence bona fide to mine within two years from the date of purchase, and shall not spend less than \$500 if mining for the superior metals; and not less than \$200 if for inferior metals. In default, cancellation of sale of mining lands.

(b) Licenses may be obtained from the Commissioner on the following terms:—Application for an exploration and prospecting license, if the mine is on private land, \$2 for every 100 acres or fraction of 100; if the mine is on Crown lands (1) in surveyed territory, \$5 for every 100 acres, and (2) in unsurveyed territory, \$5 for each square mile, the license to be valid for three months and renewable. The holder of such license may afterwards purchase the mine, paying the prices mentioned.

Licenses for mining are of two kinds: Private lands licenses where the mining rights belong to the Crown, and public lands licenses. These licenses are granted on payment of a fee of \$5 and an annual rental of \$1 per acre. Each license is granted for 200 acres or less, but not for more; is valid for one year, and is renewable on the same terms as those on which it was originally granted. The Governor-in-Council may at any time require the payment of the royalty in lieu of fees for a mining license and the annual rental—such royalties, unless otherwise determined by letters patent or other title from the Crown, being fixed at a rate not to exceed three per cent. of the value at the mine of the mineral extracted after deducting the cost of mining it.

The fullest information will be cheerfully given on application to

**THE MINISTER OF LANDS, MINES AND FISHERIES,**

**PARLIAMENT BUILDINGS, QUEBEC.**

# Ontario's Mining Lands..

THE Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals and extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and sulphides; zincblende, galena, pyrites, mica, graphite, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places, and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. Recent discoveries of corundum in Eastern Ontario are believed to be the most extensive in existence.

The output of iron, copper and nickel in 1903 was much beyond that of any previous year, and large developments in these industries are now going on.

In the older parts of the Province salt, petroleum and natural gas are important products.

The mining laws of Ontario are liberal, and the prices of mineral lands low. Title by freehold or lease, on working conditions for seven years. There are no royalties.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific Railway runs through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

HON. FRANK COCHRANE,

Commissioner of Lands and Mines.

or

THOS. W. GIBSON,

Director Bureau of Mines,

Toronto, Ontario.





## PROVINCE OF NOVA SCOTIA.

Leases for Mines of Gold, Silver, Coal, Iron, Copper, Lead, Tin

— AND —

## PRECIOUS STONES.

TITLES GIVEN DIRECT FROM THE CROWN, ROYALTIES AND RENTALS MODERATE.

### GOLD AND SILVER.

Under the provisions of Chap. 1, Acts of 1892, of Mines and Minerals, Licenses are issued for prospecting Gold and Silver for a term of twelve months. Mines of Gold and Silver are laid off in areas of 150 by 250 feet, any number of which up to one hundred can be included in one License, provided that the length of the block does not exceed twice its width. The cost is 50 cents per area. Leases of any number of areas are granted for a term of 40 years at \$2.00 per area. These leases are forfeitable if not worked, but advantage can be taken of a recent Act by which on payment of 50 cents annually for each area contained in the lease it becomes non-forfeitable if the labor be not performed.

Licenses are issued to owners of quartz crushing mills,

who are required to pay Royalty on all the Gold they extract at the rate of two per cent. on smelted Gold valued at \$19 an ounce, and on smelted Gold valued at \$18 an ounce.

Applications for Licenses or Leases are receivable at the office of the Commissioner of Public Works and Mines each week day from 10 a.m. to 4 p.m., except Saturday, when the hours are from 10 to 1. Licenses are issued in the order of application according to priority. If a person discovers Gold in any part of the Province, he may stake out the boundaries of the areas he desires to obtain, and this gives him one week and twenty-four hours for every 15 miles from Halifax in which to make application at the Department for his ground.

### MINES OTHER THAN GOLD AND SILVER.

Licenses to search for eighteen months are issued, at a cost of thirty dollars, for minerals other than Gold and Silver, out of which areas can be selected for mining under lease. These leases are for four renewable terms of twenty years each. The cost for the first year is fifty dollars, and an annual rental of thirty dollars secures each lease from liability to forfeiture for non-working.

All rentals are refunded if afterwards the areas are worked and pay royalties. All titles, transfers, etc., of minerals are registered by the Mines Department for a nominal fee, and provision is made for lessees and licensees whereby they can acquire promptly, either by arrangement with the owner or by arbitration, all land required for their mining works.

The Government as a security for the payment of royalties, makes the royalties first lien on the plant and fixtures of the mine.

The unusually generous conditions under which the Government of Nova Scotia grants its minerals have introduced many outside capitalists, who have always stated that the Mining laws of the Province were the best they had had experience of.

The royalties on the remaining minerals are: Copper, four cents on every unit; Lead, two cents upon every unit; Iron, five cents on every ton; Tin and Precious Stones, five per cent.; coal, 10 cents on every ton sold.

The Gold district of the Province extends along its entire Atlantic coast, and varies in width from 10 to 40 miles, and embraces an area of over three thousand miles, and is traversed by good roads and accessible at all points by water. Coal is known in the Counties of Cumberland, Colchester, Pictou and Antigonish, and at numerous points in the Island of Cape Breton. The ores of Iron, Copper, etc., are met at numerous points, and are being rapidly secured by miners and investors.

Copies of the Mining Law and any information can be had on application to

THE HON. W. T. PIPES,

Commissioner Public Works and Mines,

HALIFAX, NOVA SCOTIA.



# DOMINION OF CANADA

## SYNOPSIS OF REGULATIONS

### For disposal of Minerals on Dominion Lands in Manitoba, the North-West Territories and the Yukon Territory.

#### COAL.

Coal lands may be purchased at \$10 per acre for soft coal and \$20 for anthracite. Not more than 320 acres can be acquired by one individual or company. Royalty at the rate of ten cents per ton of 2,000 pounds shall be collected on the gross output.

#### QUARTZ.

Persons of eighteen years and over and joint stock companies holding free miner's certificates may obtain entry for a mining location.

A free miner's certificate is granted for one or more years, not exceeding five, upon payment in advance of \$7.50 per annum for an individual, and from \$50 to \$100 per annum for a company, according to capital.

A free miner, having discovered mineral in place, may locate a claim 1,500 x 1,500 feet by marking out the same with two legal posts, bearing location notices, one at each end on the line of the lode or vein.

The claim shall be recorded within 15 days if located within ten miles of a mining recorder's office, one additional day allowed for every additional ten miles or fraction. The fee for recording a claim is \$5.

At least \$100 must be expended on the claim each year or paid to the mining recorder in lieu thereof. When \$500 has been expended or paid, the locator may, upon having a survey made, and upon complying with other requirements, purchase the land at \$1.00 an acre.

Permission may be granted by the Minister of the Interior to locate claims containing iron and mica, also copper, in the Yukon Territory of an area not extending 160 acres.

The patent for a mining location shall provide for the payment of a Royalty of 2½ per cent. of the sales of the products of the location.

#### PLACER MINING.

Manitoba and the N. W. T., excepting the Yukon Territory.—Placer mining claims generally are 100 feet square; entry fee \$5, renewable yearly. On the North Saskatchewan River claims are either bar or bench, the former being 100 feet long and extending between high and low water mark. The latter includes bar diggings, but extends back to the base of the hill or bank, but not exceeding 1,000 feet. Where steam power is used, claims 200 feet wide may be obtained.

Dredging in the rivers of Manitoba and the N. W. T., excepting the Yukon Territory.—A free miner may obtain only two leases of five miles each for a term of twenty years, renewable in the discretion of the Minister of the Interior.

The lessee's right is confined to the submerged bed or bars of the river below low water mark, and subject to the rights of all persons who have, or who may receive entries for bar diggings or bench claims, except on the Saskatchewan River, where the lessee may dredge to high water mark on each alternate leasehold.

The lessee shall have a dredge in operation within one season from the date of the lease for each five miles, but where a person or company has obtained more than one lease one dredge for each fifteen miles or fraction is sufficient. Rental, \$10 per annum for each mile of river leased. Royalty at the rate of two and a half per cent. collected on the output after it exceeds \$10,000.

#### DREDGING IN THE YUKON TERRITORY.

Six leases of five miles each may be granted to a free miner for a term of twenty years, also renewable.

The lessee's right is confined to the submerged bed or bars in the river below low water mark, that boundary to be fixed by its position on the 1st day of August in the year of the date of the lease.

The lessee shall have one dredge in operation within two years from the date of the lease, and one dredge for each five miles within six years from such date. Rental, \$100 per mile for first year and \$10 per mile for each subsequent year. Royalty, same as placer mining.

#### PLACER MINING IN THE YUKON TERRITORY.

Creek, gulch, river and hill claims shall not exceed 250 feet in length, measured on the base line or general direction of the creek or gulch, the width being from 1,000 to 2,000 feet. All other placer claims shall be 250 feet square.

Claims are marked by two legal posts, one at each end, bearing notices. Entry must be made within ten days, if the claim is within ten miles of mining recorder's office. One extra day allowed for each additional ten miles or fraction.

The person or company staking a claim must hold a free miner's certificate.

The discoverer of a new mine is entitled to a claim of 1,000 feet in length, and if the party consists of two, 1,500 feet altogether, on the output of which no royalty shall be charged, the rest of the party ordinary claims only.

Entry fee, \$10. Royalty at the rate of two and one-half per cent. on the value of the gold shipped from the Yukon Territory to be paid to the Comptroller.

No free miner shall receive a grant of more than one mining claim on each separate river, creek or gulch, but the same miner may hold any number of claims by purchase, and free miners may work their claims in partnership by filing notice and paying fee of \$2. A claim may be abandoned, and another obtained on the same creek, gulch or river, by giving notice and paying a fee.

Work must be done on a claim each year to the value of at least \$200.

A certificate that work has been done must be obtained each year; if not, the claim shall be deemed to be abandoned, and open to occupation and entry by a free miner.

The boundaries of a claim may be defined absolutely by having a survey made and publishing notices in the Yukon Official Gazette.

#### PETROLEUM.

All unappropriated Dominion Lands in Manitoba, the North-West Territories and within the Yukon Territory are open to prospecting for petroleum, and the Minister may reserve for an individual or company having machinery on the land to be prospected, an area of 640 acres. Should the prospector discover oil in paying quantities, and satisfactorily establish such discovery, an area not exceeding 640 acres, including the oil well and such other land as may be determined, will be sold to the discoverer at the rate of \$1.00 an acre subject to royalty at such rate as may be specified by order-in-council.



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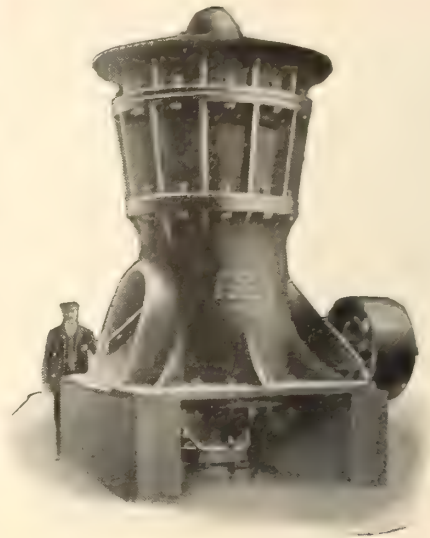
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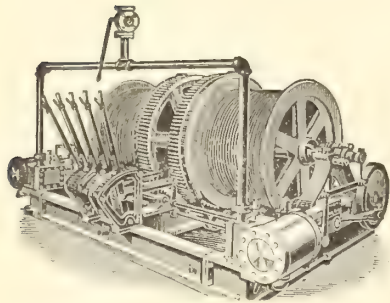
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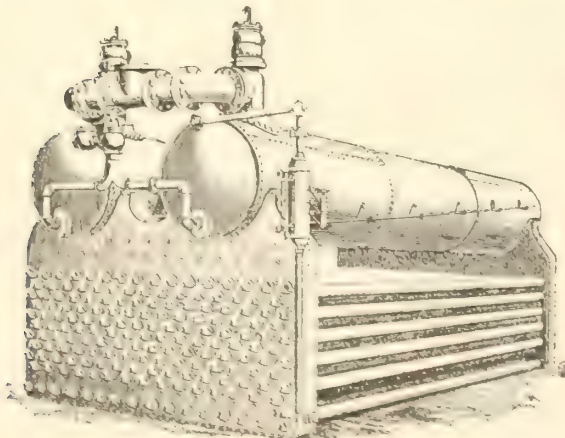
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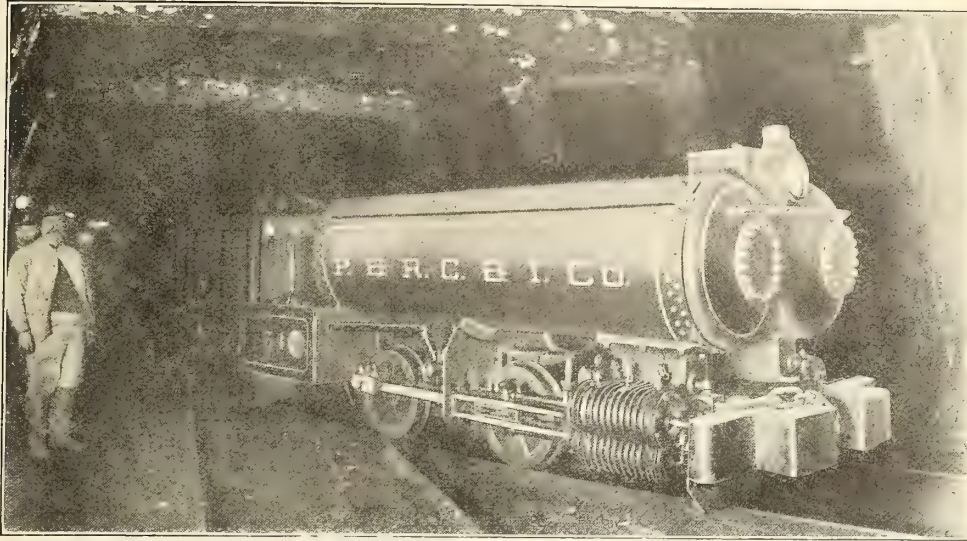
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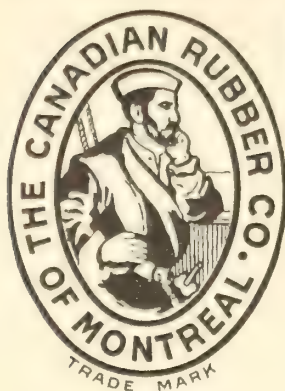
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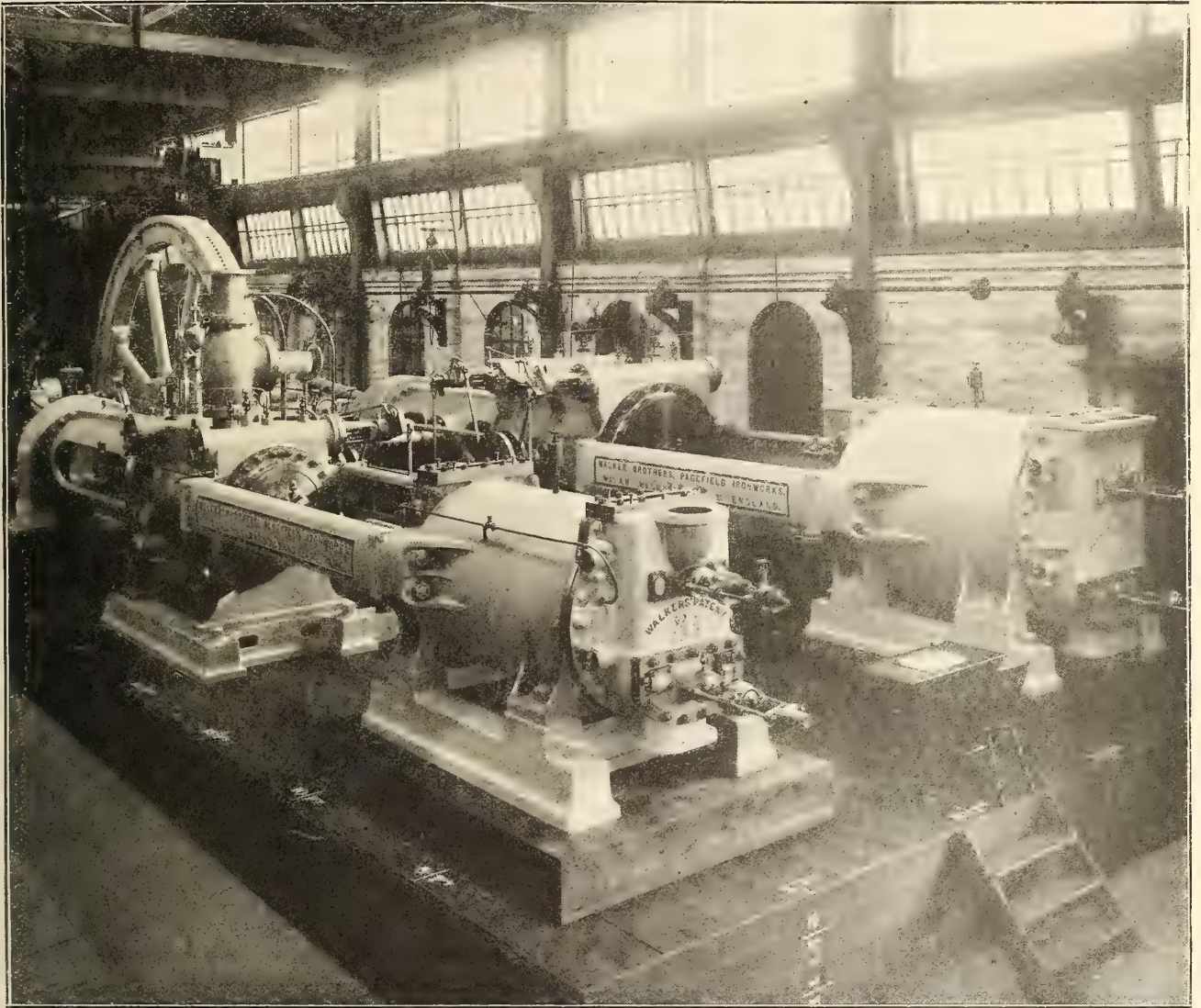
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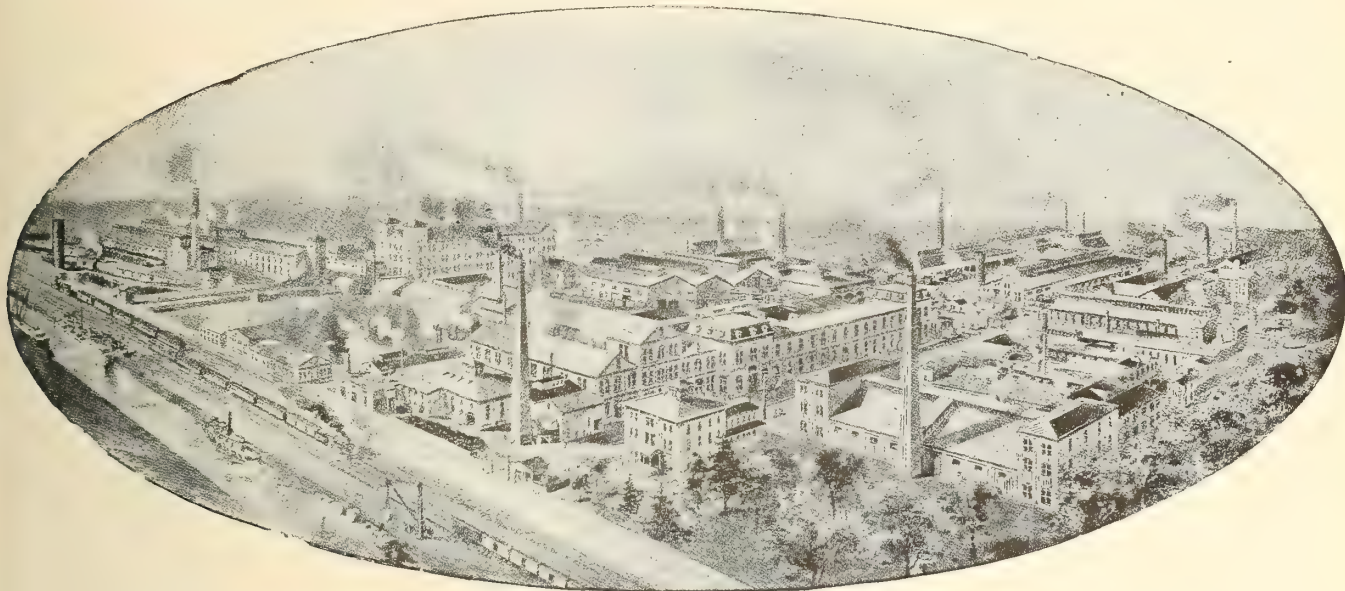
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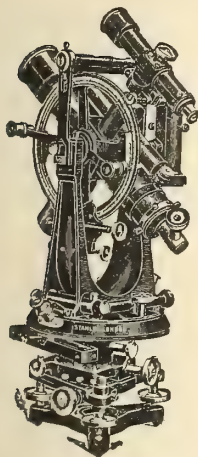


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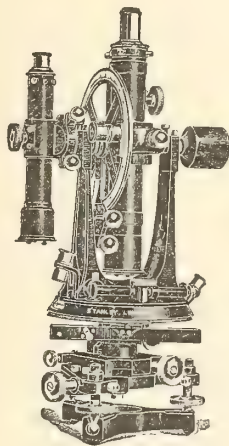
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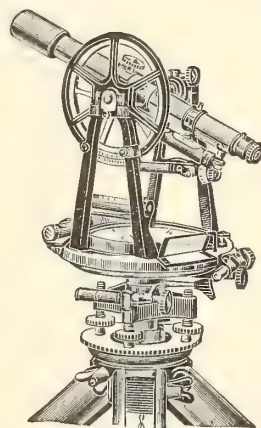
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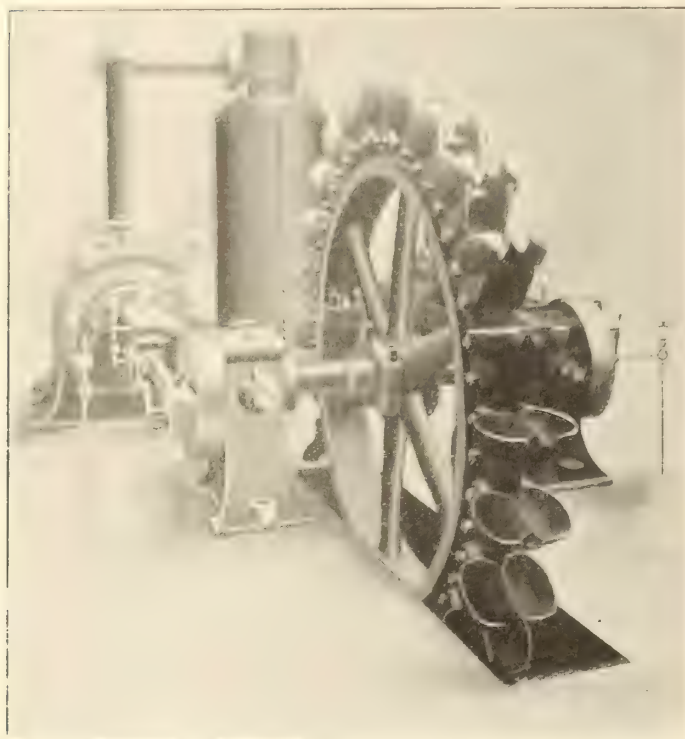
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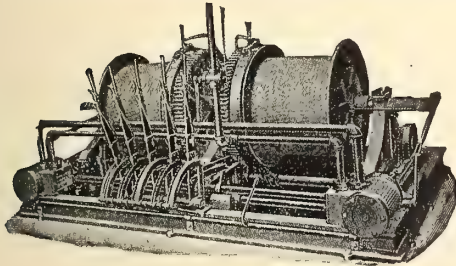


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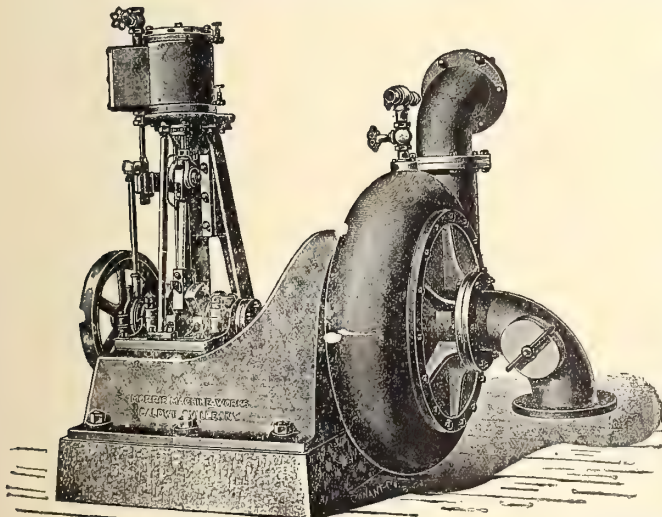
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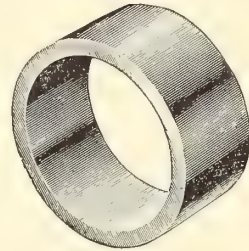
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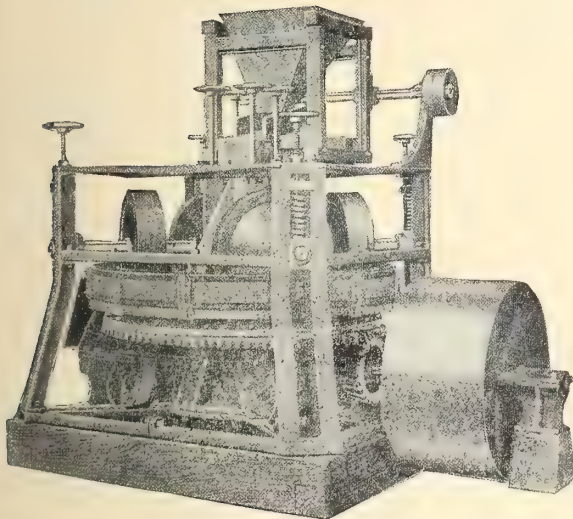
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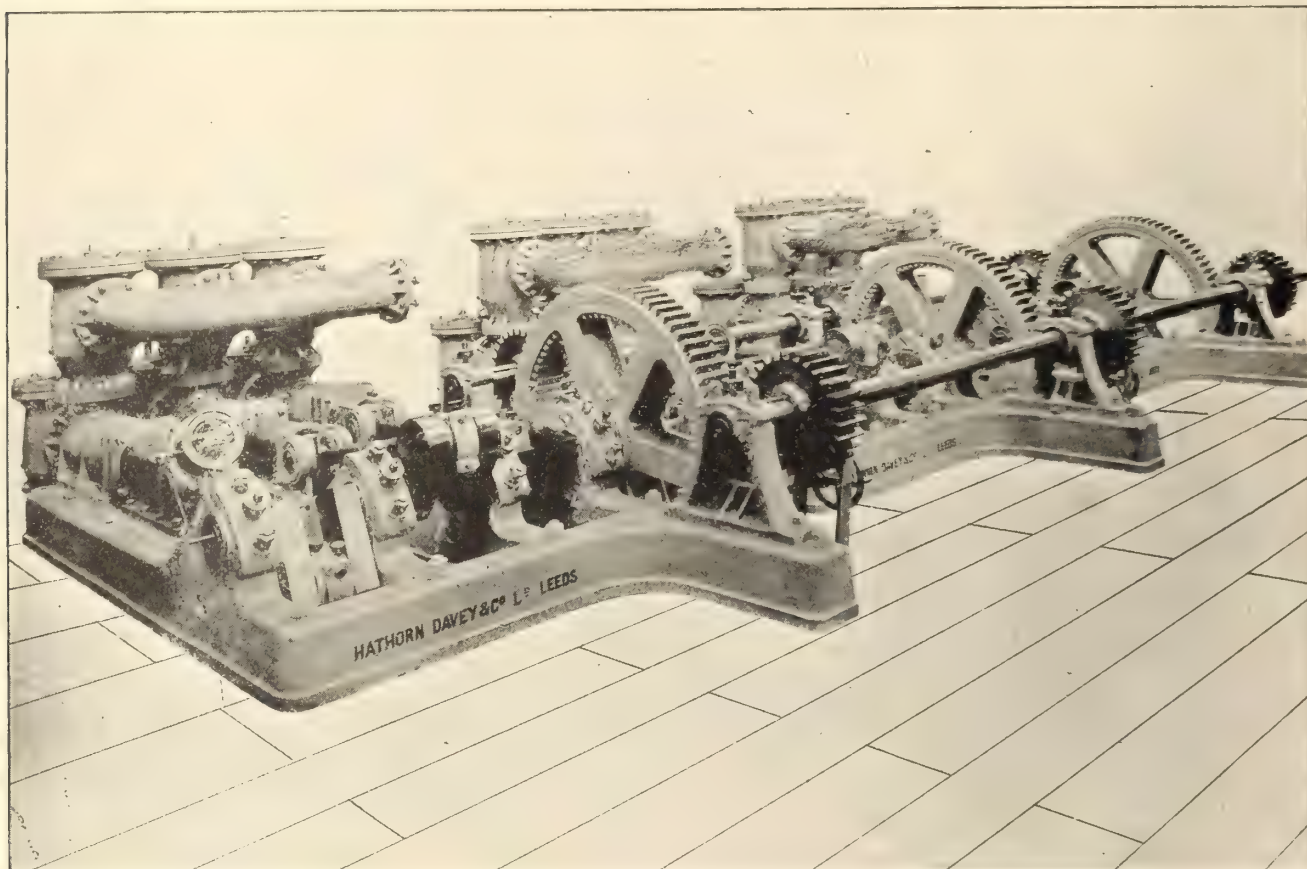
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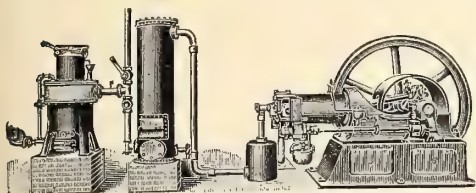
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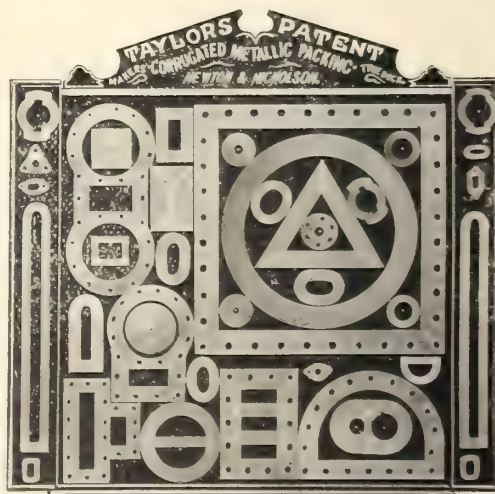
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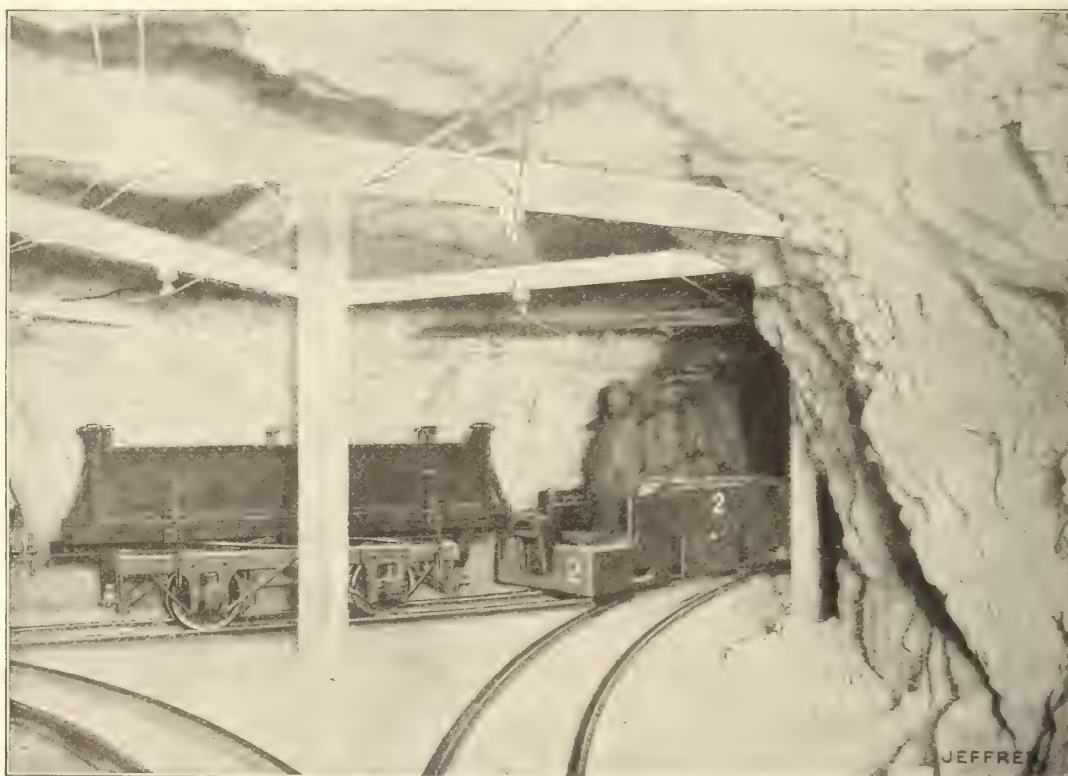
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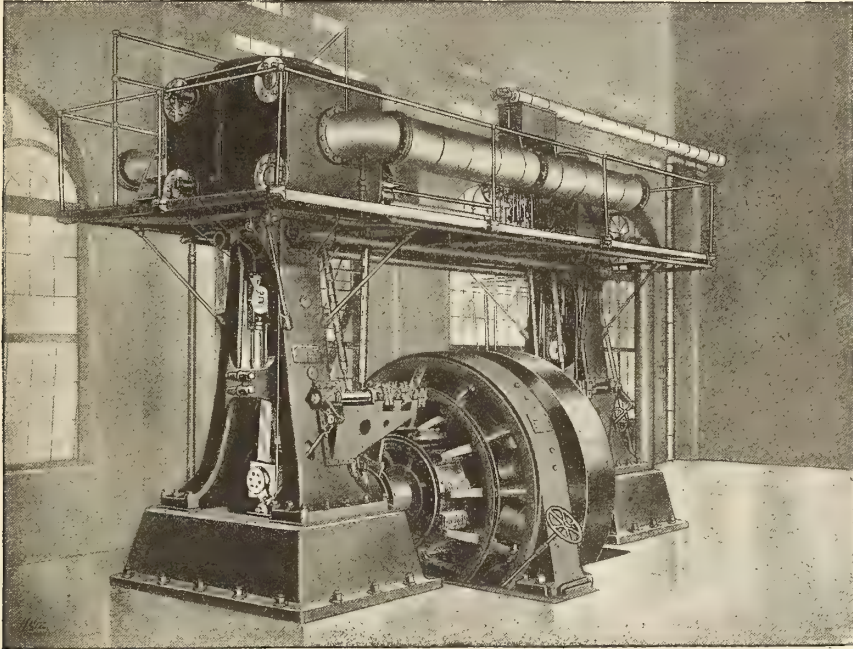
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Acting, doubtless, on a suggestion contained in an address delivered by the Hon. the Minister of the Interior during his recent visit to Dawson, the Yukon Council has appointed a special committee from among its members to draft a set of laws or regulations to govern mining in that territory, which after receiving the endorsement of the whole Council at a meeting to be called for the purpose in the course of the next few weeks, will be submitted to Parliament and passed as an Act of the Dominion at the next session of the House, probably with-

out question or change. Conditions in the Yukon are now reasonably settled and understood, so that it will not be difficult for the committee to prepare regulations eminently fitted to meet the requirements of the region.

The resignation in June last of Mr. T. A. Rickard from the editorship of the *Engineering and Mining Journal* was generally regretted by the readers of that important publication, as it was feared that it further implied his permanent retirement from the field of journalistic effort. It is gratifying, therefore, to learn that this is not the case, as Mr. Rickard who, by the way does not, like the publishers of some of our engineering periodicals, regard a paper as nothing more than a lure for advertisements, has purchased and will ere long (to be exact on January 1st next), assume the editorial control of the *Mining and Scientific Press* of San Francisco, which for many years has run a good race with its competitors for a first place among the mining and engineering journals of America. There can be no doubt at all that the usefulness of the *Mining and Scientific Press* will be increased and its scope and influence widened under Mr. Rickard's editorship, and the statement can, we think, be made without disparaging the good work already accomplished during the past twenty years by the publishers of this journal. During the time Mr. Rickard was in charge of the *Engineering and Mining Journal* he ceased to practice as an engineer, and scrupulously avoided any connection with mining or promotion affairs. We are informed that the new editor of the *Mining and Scientific Press* will follow a similar line of conduct. Our friends in the West are to be congratulated upon securing so redoubtable a champion and counsellor.

The Government mine inspectors in the Cobalt district are still alive, upon which fact we extend to them heartiest congratulations. It is really fortunate (for the inspectors) that their duties do not take them to Nevada or even law-abiding British Columbia, or, indeed, anywhere but in Ontario. Thus, a correspondent writes: "On my return here I find that the Government inspector is getting in giant work, and already a very large number of claims have been thrown open for prospecting. I



understand that in nearly every case appeals are being made and there is no doubt that in many cases there will be a long and bitter fight for possession. Meantime, of course, business is blocked to a large extent owing to the fact that no titles can be reached, and no one is inclined to spend much money in the development of claims under these conditions. Of course, the opportunity of belated prospectors who have organized for the purpose of acquiring claims thus thrown open for prospecting is not being neglected, and large forces of men are now at work following up the work already done by the original discoverers in the hope of developing something valuable enough on which to hold the claims. To my mind, should they succeed in so doing, more particularly by the mere development of the vein on which an original discovery had been made, they are only doing gratuitous development for the benefit of the original discoverer. However, that of course is a matter that will have to be decided by the courts later on."

We have once or twice before mildly suggested to our estimable contemporary, the *London B. C. Review*, the desirability of making certain of the authenticity of its Canadian mining intelligence before commenting thereon. However, the *Review* has again ignored this warning, and in its issue of Sept. 9th, a most ridiculously ignorant leading article appears on the subject of the new cobalt-silver district of Coleman Township, Ontario. If our contemporary would obtain and peruse the excellent reports of the Ontario Bureau of Mines and, if we may be pardoned the egotism, if he would only read the *CANADIAN MINING REVIEW*, he would have known, some time ago, that the new district has not produced any two and a quarter millions of dollars "within a few months." Also we regret to advise the *B. C. Review* that the *Toronto Globe* is notorious, on this side of the water, for the inaccuracy of its statements whenever it chooses to print anything respecting mines or mining. The statement attributed to the *Globe* that "for transportation alone \$200 was paid on a carload of 23 tons" may be correct, but when it makes the statement that \$25 per sack of 140 lbs. have been charged for treatment it is dreaming, it is "away off," and it needs a very large dose of somebody's Fruit Salts. Finally, we regret that our contemporary has so mixed up the Hudson's Bay Company, a corporation several hundred years old, with a little one or two months old mining company, as to attribute to the big imperial Hudson's Bay Company an interest in claims in this section. We beg the *B. C. Review* to get a few geographies, encyclopaedias, Government reports and other sources of information, and to religiously dig into and absorb them before undertaking to make further editorial announcements concerning Canada and things Canadian.

It is stated that before undertaking a revision of the mining laws of the Province, the Ontario Government hopes to secure an expression of

opinion from all interests directly or indirectly affected, and that consequently meetings of mining men in the chief productive centres should, it is suggested, be held with this object in view. While no harm, and possibly some good might be accomplished by the holding of meetings in the various mining sections, yet the only way by which the mining community can adequately present their wishes with some fair degree of unanimity is by calling a convention to meet at some central spot, more appropriately at the capital of the Province, at which the delegates attending would represent, not only localities, but interests and classes. If some such action as this be not taken the Government will have so much conflictory evidence to sort out and attempt to reconcile, that a wise administration would postpone indefinitely the proposed revision; while an unwise one in attempting to please all would produce a law which would satisfy none, since it would be unworkable. If the Ontario Government is, as we believe, honestly desirous of giving the Province a good mining law, it should itself take steps to encourage a meeting of representative mining men to give their views on the suggested revision. Matters, too, would be enormously facilitated and the likelihood of a speedy reconciliation of differences assisted by the attendance, which could doubtless be arranged, of expert advisers, such, for example, as Dr. Raymond, of New York, or other authorities on mining law, whose experience and advice would be invaluable. A representative convention would be productive of infinitely more satisfactory results than a commission, while it would also be a less expensive luxury.

The "Big Four" schemers, whose methods have previously been exposed by the *MINING REVIEW*, are again at their tricks, as witness the following paragraph from a recent issue of the *Vancouver World*:

"Riches in the rough may be seen by the passerby in the window of the Dominion Trust Company, Hastings Street, the said riches being gold-copper ore, which would make a prospector's eyes fairly glisten. The samples shown are from the celebrated Big Four mine, situated between the Le Roi and the War Eagle, at Rossland. They have, however, travelled far since they were cut out of the strata, having been exhibited at St. Louis, where they took first prize as being the richest in the world. Naturally, the samples are attracting much attention, more especially as it is known that the mine they came from is the subject of competition between the C.P.R. and the Great Northern railway companies, both of which find that they need it in their business. The Dominion Trust Company is placing a limited number of shares on the Vancouver market."

Anent which the *Rossland Miner* remarks that it contains hardly a word of truth, and adds:—"The Big Four is not situated between the Le Roi and the War Eagle. It is also certain that the ore of the Big Four is not the richest in the world, and it is



equally certain that the Big Four ore did not take the first prize at St. Louis. It is also certain that the Canadian Pacific and the Great Northern are not competing for the ore of the Big Four, as it has not produced enough to compete for.

"If the Big Four, however, produces enough ore to make a decent shipment there is no doubt about the railway companies competing for it. It is high time that the systematic misrepresentations of the Big Four should cease. The methods followed by the Big Four are detrimental to this camp, and some means should be found to put an end to them."

We direct attention to a letter published elsewhere in this issue from Mr. W. G. Trethewey, of Cobalt. This letter is interesting in that it represents a point of view differing diametrically from that held in general by claim owners and others interested in the development of the Cobalt district, in respect to the policy adopted by the Ontario Government in withholding title to locations unless arbitrary conditions, in no wise specified by the "Regulations for Mining Divisions" or by the Mines Act, are fulfilled to the satisfaction of an official specially appointed to adjudicate thereon. While it is refreshing in this world to run across a really contented man (though Mr. Trethewey has every excuse for his present frame of mind in that he has large interests in two valuable Cobalt properties), at the same time we regret our inability to admit even his premises, much less his conclusions. In the opinion of at least a very considerable majority of the miners and prospectors in the district there is no set of circumstances which could justify the adoption of the autocratic and high-handed measures that have been pursued. At the same time our correspondent states the "Act has not been changed," but merely "enforced." Surely, here is a mis-statement at the start. The Act has not been changed, but it has been elaborated by Orders-in-Council to such an extent that it has become unrecognizable. What is the good of an Act of Parliament at all, if its very sense and provisions may be changed at the discretion of individuals in this fashion? Mr. Trethewey remarks that "under the present arrangement the original discoverer" is secured in his title! But this, too, is quite contrary to actual fact, (see list elsewhere of claims thrown open during past month), since the prospector after staking his ground is obliged to go and ask a policeman, beg pardon, mine inspector, the riddle: "Please, sir, when is a location not a location, and need I pull up stakes?" Of course, if the inspector is good enough to pronounce that the discovery is, in his opinion, a valuable one, then the discoverer takes high rank at once, as the "real thing," the genuine, legitimate, bona fide, honest prospector, quite innocent of any blanket(ty)-ing (blank?) intentions. It is probably true, as Mr. Trethewey suggests, that "conditions at Cobalt are unique," but then anything more unique than the mining regulations it would be impossible to conceive.

The *Iron Age*, referring to the copper industry on this continent, points out that practically all the Canadian copper, and a very large part of the Mexican product, is refined and marketed in the United States, and that a considerable share of the American exports are, therefore, really Mexican or Canadian metal in transit for the world's market. Our contemporary refers to Canadian dependence upon American metallurgical works as being striking, and proceeds to say in evidence of this that, one of the large companies of the Boundary district in British Columbia has its smelting plant across the line in Washington (*sic*), other concerns ship for future treatment either their matte or their converter bars to Puget Sound or Atlantic Coast refineries, while the greater part of the copper and nickel matte of the Sudbury district goes to the States for separation and refining. The same state of affairs exists in Mexico, the only large Mexican producer shipping direct to Europe being the Boleo, in Lower California. It is furthermore pointed out that, as the copper interests of Canada and Mexico are largely owned and controlled by American capitalists, the three countries have become practically a unit, so far as copper production is concerned. The suggestion is therefore offered that it would be more correct in presenting the statistics of United States copper exports to make allowance for these imports, and the point is illustrated by reference to the figures recently published by the Bureau of Statistics. The American exports of copper, (excluding ore, the contents of which is not known), were, for the two years ending June 30th, 1904, and June 30th, 1905, respectively, 422,595,277 lbs. and 591,362,271 lbs. of copper. The imports were, for the fiscal year ending June 30th, 1904, 175,238,869 lbs., and for 1905, 190,449,406 lbs. Of this, 108,808,940 lbs. were imported from Mexico in 1903-4, while this quantity was increased to 124,743,986 lbs. in 1904-5. For the last two years the imports from British North America have averaged nearly thirty-seven million pounds of copper. At the same time, the United States export of copper (in which this Canadian and Mexican product is included) increased last year to over four hundred million pounds, or a gain of 153,556,457 lbs. in twelve months. Our contemporary remarks that such figures throw a flood of light on the tremendous development of the copper consumption of the world and explain the steady rise in values during the past year, in spite of the great expansion in production which has been, and is still, taking place in the United States, Canada and Mexico.

#### THE LE ROI SQUABBLE.

As we stated in a recent issue, the Le Roi amalgamation scheme has by no means fallen through, as in view of the consolidation of the Blackstock and Canadian Pacific mining interests in British Columbia some of our readers were inclined to believe. As a matter of fact, that arrangement merely facilitates the carrying out of the more comprehensive plan, the consummation of which is now practically de-



pendent on a ratification by the shareholders of the Le Roi Company at the annual general meeting which will be held shortly in London, for no opposition is to be anticipated from the Canadian interests. The dismissal (for it amounts to that) of Mr. A. J. McMillan, the company's managing director, meanwhile implies that Mr. Waterlow has been able to convince his colleagues, including the chairman, Sir Henry Tyler, that his view of the situation is the correct one, while that of Mr. McMillan is at least prejudiced. We observe that some of the London financial papers have expressed sympathy with the late managing-director, and suggest that he has been badly used, and, more especially, as "since he took charge of the property its prospects have improved enormously." That may or may not be true, but in a mine such as the Le Roi it is not a very difficult matter to effect, by the process known as gutting to show temporarily any sort of exceptional result; moreover, some of the credit that Mr. McMillan may claim may very possibly rightly belong to the late manager, Mr. S. F. Parrish, who did a great deal more for the Le Roi than he was ever thanked for. But this is all beside the point. As we understand it the directors realize, what is undoubtedly true, that handicapped as it now is with an excessive capital, a white elephant of a smelter, and other legacies of erstwhile unwise counsels, the Le Roi cannot be placed upon an adequate profit-earning footing. It is, therefore, evident that a radical change in policy is requisite, and the amalgamation scheme appears to the majority to offer the best possible way out of the wood. Mr. McMillan has a perfect right to object if he considers it his duty to do so, and we confess, that unless his colleagues had very grave reasons for distrusting his honesty of purpose, his ejection savours somewhat of high-handedness, and the action of the Board, except upon these premises, would not have been politic. If Mr. McMillan's opposition originates from a conscientious scruple as to the advantages that will accrue to Le Roi shareholders from a consolidation of interests as proposed, even if his judgment be at fault, one is forced to admire the principle on which he has taken so firm a stand, but there are certain matters in connection with his present attitude that require to be cleared up before his entire disinterestedness can be admitted.

### ELECTRIC SMELTING OF IRON.

Elsewhere will be found a communication from a correspondent anent the newspaper booming of electric processes for steel making. In this connection, as confirmatory of our correspondent's views, we call attention to a recent paper by Mr. R. S. Hutton, appearing in the Proceedings of the Society of Chemical Industry.

Mr. Hutton presented this paper before the Manchester section of the Society, and in it he shows very clearly that the costs of electric power generation for electric lighting and traction purposes are so very different in character from the

costs of the fluid when needed for electric smelting, that no definite conclusions may be drawn from figures given by lighting or traction companies, and chiefly by reason of the very intermittent character of the load, instancing that the average power station is fortunate to get a 15 per cent. load factor, whereas chemical works, using electricity for the manufacture of chemicals, have a nearly constant load factor of 100 per cent. The figures of \$30.00 to \$40.00 per horse-power year, are given by Mr. Hutton with the prophecy that with producer gas such figures might be reduced to \$20.00 a year. The corresponding figures for power delivered by the corporations at Niagara vary from \$17.00 to \$21.00 per horse-power year. Mr. Hutton goes on to say there does not appear to be any immediate probability that electrical methods will be used for the reduction of metallic iron from its ores, and that the application of the electric furnace to the metallurgy of iron is largely founded on the experience gained in the manufacture of calcium carbide, designating the few small scale experiments as of more historical than technical interest. Again, Mr. Hutton makes mention of the fact that even the carbide furnaces have produced chiefly rich ferro alloys, such as ferro chromium and ferro silicon, which are exceedingly high-priced and are chiefly of service to portions of the steel industry. Mr. Hutton's opinion is that "direct competition with the blast furnace is obviously out of the question so far as all present iron-producing countries are concerned." Mr. Hutton furthermore lays stress upon the possibility of replacing about two-thirds of the present fuel used in the production of pig-iron by electric heating; as only about 33 1-3 per cent. of the coke charged is necessary for the chemical reduction of the ore, the balance is employed in producing and maintaining the requisite temperature, and it is for the maintenance of this temperature that Mr. Hutton suggests the utilization of electricity. As to the possible advantages of producing steel by electric methods the matter still remains to be examined on its own merits, and apart from any connection with ordinary processes. From the report of the Canadian Commission it was long since clear that all the operations of smelting and refining can be successfully accomplished by electricity, but it was also made sufficiently clear that wherever coal was cheap it was quite certain that much of the heating could be more economically done by the combustion of fuel than by the application of the electric arc.

### VALUE OF TOPOGRAPHICAL MAPS IN GEOLOGICAL FIELD WORK.

Dr. R. A. Daly, in an introductory note to his report on the "Geology of the Western part of the International Boundary (49th Parallel)," fully endorses the argument we advanced in a recent issue on the advantage and economy of having topographic maps of a locality prepared before it is



visited for the purposes of geological investigation. Dr. Daly remarks:—

"This season is the first in which I have been supplied with topographic maps on a satisfactory scale and of sufficient accuracy for thorough geological mapping. The experience of the four years engaged in this boundary work emphasizes the futility of attempting to combine, in one field season, the topographic and geologic surveys of a mountainous region. The topographic map resulting from such a combination of forces may, indeed, be a permanent asset to the government and the people, but it is safe to say that on account of complexity of the average mountain range, the geologic map constructed along with its topographic base, is, from a *structural* point of view, necessarily very imperfect, if, indeed, it be not quite worthless. Such a geologic map cannot be considered a permanent asset. The same area must inevitably be studied again before its map can be placed among the standard geologic maps of a government survey. This conclusion does not apply to reconnaissance surveys which can never be used in the determination of detailed rock structures except in an incidental way. On the other hand, the structure and origin of the rock formations in any area form the very kernel of the truth which should be expressed in a standard geologic map issued by a government for the benefit of the people. My own experience in this agrees with that of every other Dominion geologist working in the mountains as well as with that of the many workers in the mountains of Europe, India and the United States. True economy teaches that topographic parties should precede the geologists in such regions. The geologist must have his topographic map in his hand if he is to attack with confidence the problems of rock structure, rock origin and ore genesis. A special economy of time and money resulted this season from the fact that I possessed the topographic map of the boundary belt. Through August and September smoke so obscured the country that a topographic corps must have remained idle. Triangulation was quite impossible; other branches of the work must have been almost as completely restricted in a rugged region where one could see but a few hundred yards in any direction. Nevertheless, with the Commission topographic map at my disposal I was able to map geologically in detail three hundred square miles of the belt. Without the aid of that map, half of the field season would have been lost, though the expense of the pack train and assistance were as great as during the times of active field operations."

Dr. Daly's view is also shared by Prof. Brock, who, referring to the work of the Survey in the Lardeau district of British Columbia, points out that serious delays resulted last year from the fact that the topographical and geological surveys were carried on concurrently.

## THE ZINC INVESTIGATION IN BRITISH COLUMBIA.

The mining fraternity throughout Canada will, we think, join with us in protesting strongly at the treatment accorded Mr. A. C. Garde, a Canadian engineer of recognized standing, at the hands of a certain political clique, in the lead mining districts of Kootenay. Mr. Garde was appointed by Dr. Eugene Haanel to act as a member—in the capacity of assistant to Messrs. Ingalls and Argall—of the Zinc Commission in British Columbia. No sooner was this known than certain individuals with whom Mr. Garde was for reasons (not at all to his discredit) *non persona grata*, commenced an attack against him and political influences were brought to bear for his removal from the Board. This succeeded in so far that Dr. Haanel fearing, doubtless, that the usefulness of the Commission's work was in jeopardy, appointed Mr. J. L. Retallack in Mr. Garde's stead. Mr. Retallack, however, although we understand bitterly opposed to the appointment of Mr. Garde, was obliged to refuse the appointment realizing that he had not the necessary technical qualifications, and Mr. Garde was reinstated. Under these circumstances the matter would not have required notice in the REVIEW, but for the fact that the *Nelson Daily News*, probably the most influential newspaper published in the Kootenays, continues to be-cudgel Dr. Haanel for his appointment of Mr. Garde, on the ground that he has disregarded the advice and wishes of local mine-owners, "who had at the outset urged on him" the desirability of entrusting the expert work in connection with the investigation to "disinterested specialists, men of recognized ability and standing in the mining world," the inference of course being that Mr. Garde is incompetent and prejudiced. We submit that our contemporary, which is, when uninfluenced by political consideration, generally fair-minded and impartial, has no right to infer anything of the sort of an engineer of Mr. Garde's reputation and standing. To Mr. Garde the Slocan mine-operators owe a great deal;—at any rate they thought well enough of him when he was resident in the district to elect him president of their association,—for he was the first man among them all to address himself to the practical solution of the zinc problem in British Columbia, to call attention to the economical importance of the occurrences, and, if we recollect rightly, to suggest an investigation of these resources under Government direction. But in view of local jealousies, these things are now forgotten. To the unprejudiced man the appointment of Mr. Garde, who is no longer practicing professionally in British Columbia, and has no financial interest in the findings of the Commission, will appear to be an eminently suitable one, and not less so for the very reason urged against him, that he has gained by residence a special knowledge of the district in which the investigations are to be conducted, a qualification which should be of considerable service to his colleagues. If, therefore, what the *News* affirms is true that "the probable outcome of the business will



be, that the report of the Commission will be discredited in advance, while certainly its work will be seriously handicapped by the avowed determination of several of the principal mine owners to refuse Mr. Garde access to their mines,"—then either the conduct of these mine-owners is childish, or there is something more than an alleged objection to Mr. Garde to explain it. It is well to remember, however, that the zinc investigation was devised to promote and assist the development of a Canadian industry and not for the benefit of individuals, consequently no individual has any right to place obstacles in the way or restrict the scope or usefulness of the enquiry.

Since the above was written, our correspondent in British Columbia has sent us the following information:—

"The Zinc Commission is meeting with an untowardly reception in the Kootenay. There is a legitimate grievance and one that is not legitimate. In the first place, to be of much avail, the Commission ought to take in all the zinc properties and not merely the mines which have showed a large percentage of zinc ore as depth has been gained. To do this, considerably more time than that which has been allotted, which is variously stated as from two to four months, should be given to the enquiry. At a time when zinc was a distinct detriment to a mine, every prospect which showed ore containing a heavy percentage of zinc was left unworked. It was seen from the start that under the then conditions its profitable exploitation would be impossible unless the zinc would lessen its percentage as depth was gained. Unfortunately the reverse has proved to be the case, mines have rather heightened than lowered their percentage of zinc with increased depth. Now every one of these prospects is of value in the estimation of the magnitude of the zinc resources of the Kootenay. But to anything like thoroughly examine these properties it would be necessary for the Zinc Commission to extend its labours into next season, doing as much as possible this and devoting a portion of the winter for considering the problems of zinc reduction especially where chemically combined with iron. The other grievance is childish. A dead set has been made at the appointment of Mr. A. C. Garde as the local expert. It is claimed that this is altogether political, but this hardly seems to be the case as the objection comes not alone from Kaslo but also from Sandon. Now the Sandon opposition would seem to originate from the Payne (on account of matters connected with details of Mr. Garde's management of which a lawsuit is pending), the Lucky Jim and another American mine, the manager of which is actively opposed to Mr. Garde, is making himself active in the opposition. This can hardly be termed political. These men have refused to allow Mr. Garde to enter their mines. But, under the constitution of the Commission, as arranged by Dr. Haanel, it is not Mr. Garde but Mr. Phillip Argall who is to examine the mines, Mr. Garde's duty is to look into the prospects. Therefore, if Mr. Argall is to be excluded from the

mines of these men because they have some private cause of offence with his local colleague, such a procedure cannot be termed otherwise than childish and petulant. It is declared but not officially, nor by any responsible mining board or man that Mr. Garde is thought to be lacking in knowledge of his subject despite his institution of the first zinc concentrator in the country, but the public generally are willing enough to accept Dr. Haanel's judgment in this matter."

Therefore, it is probable, despite the reiterated petitions made to Ottawa, that this side of the controversy will be allowed to drop and the real cause of grievance, the lack of sufficient time, will urge itself more insistently upon the attention of the department.

### THE TARIFF COMMISSION IN THE KOOTENAYS.

A special correspondent of the MINING REVIEW writes:—

The members of the Tariff Commission were somewhat astonished at the free trade sentiment expressed by the miners of the Boundary and of Rossland. In Nelson the representatives of the lead mining interest held opposite views. What the lead men ask is a permanent duty upon lead and its products at the expiration of the bounty system. It is also desired that the chief duty should be placed upon the production of pig lead, as, it is stated, that here the chief cost is incurred and not in the manufacture of pipe and of sheet lead from the pig. The justification for the duty was reasonably put. Lead mine owners pointed out that to develop a lead mine it was necessary to spend much time, years in fact, in development before the property could be a sure and steady shipper. This involved the expenditure of much capital. Now, capital would think twice and did think twice before investing in the lead mines of the Kootenay. There was no surety about the price of lead. It was possible that at the end of the development that it would be found that lead had dropped so much that its mining would be unprofitable. In other words, all the capital expended upon that development would be practically wasted. As long as there existed a bounty system there was no such fear. But the bounty system was only inaugurated for five years, half of which time has elapsed. Were the bounty to be counted upon to continue, then conditions would be different;—they would be more stable. And stable conditions are those to which the capitalists look for profit. The same would be the case were a permanent duty to be placed upon the import of lead. It would guarantee the Canadian market.

It was further urged that the manufacturers of paint should be more sharply looked after and compelled to place upon their paints the percentage of lead contained therein. At present the adulterators used little lead and the paint was not lasting. The manufacturers of good paint suffered because of their cheap competitors. The public were not



protected and half the farmers who wanted to paint their farm buildings or houses did not know one brand of paint from another. Were the practice of other countries followed with regard to paint adulteration the public would be protected, the adulterated brands would be driven out of the market and more lead would be used in Canadian paints. Hence there would be a larger market for Canadian lead.

The men of Rossland and the Boundary asked for no protection. They viewed the matter from an entirely different standpoint. They maintained that the machinery, steel rails, dynamite, candles purchased in Canada were of inferior quality, and hence they had to be purchased from the United States and on this account desired that the barriers be let down, placing many things on the free list and reducing the tariff in other cases. In this connection it was pointed out that British Columbia pays in proportion far more than does any other portion of Canada. That its cost of administration, owing to the configuration of the country is unavoidably higher and hence the provincial taxation was higher than would otherwise happen. Hence if there were an arrangement by which British Columbia with its sparse population had not to tax itself so heavily, i.e., by an increase of the provincial subsidy, the mines would be in a better position to pay the imposts demanded on machinery, etc., and so permit of the upbuilding of Canadian industries in the east. In other words, the granting of "better terms" to the province would take away the chief argument of these free traders for their mines' sake.

Another argument used was that the mines of the Kootenay are paying the highest wages to their employees. Hence a large and industrious class of skilled white men, including the pick of the Northwestern States of the Union, are being attracted into the province and are building homes for themselves and thus creating a market for the rancher and farmer in the mountain valleys and lakeside alluvial. They were, therefore, in the best sense upbuilding the country. There is not a mine in the Kootenay that is employing Chinese labor, except in a stray case here and there of a Celestial cook. Partly for this, and partly for other reasons, the mine-owners of the districts referred to, objected to a duty of \$2 per thousand being placed on rough lumber, protesting that this would merely mean that \$2 a thousand would be added to the price of the lumber wanted for their mines for timbering, etc. Now, the lumber camps of the Kootenay, driven, they declare, by the example set by the coast mills, are employing Chinese more and more, and a case occurred in the little settlement of Salmo near Nelson, where the employment of Chinese in a local mill meant the destroying of that village. Protection is wanted for those, they maintained, who are upbuilding the country and not merely exploiting its natural wealth. And the best kind of protection the low grade copper gold mines could have was the lessening and the removal of duties as specified.

## THE NEW MINISTER OF COLONIZATION, MINES AND FISHERIES FOR QUEBEC.

The Hon. J. Prévost, who recently entered the Quebec Government as Minister of Colonization, Mines and Fisheries, was born at St. Scholastique, County of Two Mountains, and educated at St. Mary's College, Montreal, and at Laval University. He was admitted to the bar in 1894, and in 1900 was elected president of the Liberal Association of the County of Terrebonne, the same year being returned to the local house as member for the district. Four years later he was re-elected by a large majority.

It is the intention of the new Minister to introduce radical amendments to the present mining laws of the province with a view to stimulating prospecting and also to render title more staple. It is greatly to be hoped in the interest of the industry in the Province of Quebec, that this programme will be carried into effect.

## THE HUNTINGTON - HEBERLEIN PROCESS.

A United States Consular report states that the Sullivan smelter at Marysville, B.C., produced in July between 500 and 600 tons of bullion operating under the Huntington-Heberlein process. The first month's operations were largely experimental, but the results were exceedingly satisfactory, and the new smelting process is a success beyond question. The ore treated was exclusively from the Sullivan mine, running about 30 per cent. lead and 12 to 14 ozs. in silver. The smelter has a capacity of 100 tons daily, but the roasting apparatus is not sufficient to keep the plant running at its full capacity. It is therefore proposed to increase the roasting facilities. The Huntington-Heberlein process is said to show an advantage, in the operating cost, of about \$2 per ton of ore smelted, as compared with the ordinary process.

This process is now coming into very general use, displacing the old processes of lead smelting. One of the latest installations is at Tarnowitz, Prussia, and an extremely interesting report of the plant, translated from the German, is published in the Engineering and Mining Journal of New York, of Sept. 23rd.

## CHANGE OF MINING REGULATIONS IN THE YUKON.

An order-in-council has been passed providing that in future a royalty will not be required or collected on gold produced from quartz from claims upon which \$25,000 has been spent on machinery, etc., within five years after the date of the order. A plant with a minimum capacity of 5 tons per day must be installed for milling or otherwise treating the ore, the value of which is to be included in the estimate of outlay. The royalty is abolished with respect to copper claims provided \$50,000 is expended upon them within ten years and a smelter erected of not less than 10 tons capacity per day.

### A POPULAR ENGINEER.

Mr. Chas. Fergie, whose appointment to the managership of the Dominion Coal Company we announced in a recent issue of the *MINING REVIEW*, was presented with an address on the occasion of his departure from Westville, by the officials of the Drummond colliery and members of the Ladysmith Lodge, P. W. A. This address reads as follows:—

"The undersigned, in behalf of the officials of the Drummond colliery and the members of Ladysmith Lodge, P. W. A., desire to embrace this op-

"We congratulate you on your well deserved promotion to a much larger and more responsible field and we assure you that in your new sphere we heartily wish that you may attain to a highly satisfactory and honourable success.

"In parting, we beg you to accept this cane as a memorial gift and hope you may not only find it a reminder of pleasant former associations, but also an article of present practical usefulness.

"We also beg permission to present to Mrs. Fergie this piece of silver plate as a token of our respect for a lady who has shared responsibilities with



MR. CHAS. FERGIE,  
New Superintendent of Mines for the Dominion Coal Co.

portunity of expressing our personal regard for you and our appreciation of the conciliatory and honourable way in which you have discharged your duty toward the men under your charge as well as your devoted faithfulness toward the company during the long years of your official connection with the Drummond colliery.

"In common with the citizens of Westville, generally, we have rejoiced in the vigor, professional skill, sagacity and enterprise which you have displayed, evidencing themselves in greatly enlarged outputs, expanded markets and thorough equipment of works.

yourself at Clare Park and whose charming hospitality there and gracious influence in the community has been explicitly for good. We can always congratulate you on your good sense in having, years ago, taken as your partner in life one of the fair daughters of Canada.

"We hope that in the rising city of the east you may find generous co-operation and encouragement, and we heartily wish for yourself, Mrs. Fergie and family long life, health and happiness.

We are enabled to reproduce the accompanying excellent recent photograph of Mr. Fergie, by the kind courtesy of the *Montreal Standard*.



## RECENT DEVELOPMENTS AT THE CANADA CORUNDUM COMPANY'S MILL.

(By D. G. Kerr.)

Three of Prof. Richards' hydraulic classifiers, which were recently installed at this Company's mill, are now in operation and doing excellent work on the fine sizes. The mill practice may be described as follows: The ore is conveyed from the quarries to a "coarse ore" bin, which has a capacity of 400 tons, it is conveyed from chutes (on the under side) to a 15x24 inch crusher, of the Blake type, by which it is crushed to 2 1-2 inches and

minute. They are covered with perforated sheet steel, the holes being 3 mm. in diameter. The undersize, or ore passing through these holes, is taken to No. 1 elevator, while the oversize goes to two sets of rolls also 14x40 inches. The pump from these rolls is elevated by No. 2 elevator and made to pass through two more trommels, of the following dimensions: 3 feet diam., 13 feet long, with 18 revolutions per minute, the perforations being 3 mm. The undersize from these trommels goes to the No. 1 elevator and the oversize to a set of 14x24 inch Gates' rolls. The crushed ore from this set of rolls is again conveyed to the No. 2 elevator, the



View Showing Tramway from the Mill to the Wharf.

dropped on to an 18-inch conveying belt 85 feet in length, having an elevation of 16 feet at the delivery end. The stream of coarsely crushed ore is distributed to three fine crushers, two of the Blake type having 6x24 inches jaw opening and one Gates' gyratory crusher. These three machines crush the ore to pass a 3-4 of an inch ring and under. It is then dropped into a bin of 300 tons capacity. From this fine ore bin the ore is fed to rolls by a Challenge feeder. The first set of rolls which are 40 inches in diameter and 14 inches face, run 85 revolutions to the minute. The product from these rolls goes to two trommels, which are three feet in diameter, 13 feet long, and make 20 revolutions per

process being continued until all the ore is finally crushed sufficiently small to pass through a 3 mm. screen. As already mentioned, the material which passes through the 3 mm. holes of both sets of trommels is taken to No. 1 elevator. This elevator lifts the fine pulp to a height of 75 feet where it is dumped into a "dividing box," in which by the introduction of water a division is made into three streams of water and pulp, which are piped to the three classifiers. These classifiers are built from the designs and plans of Prof. Richards of Boston. They consist of six boxes placed in a line, containing water pressure compartments; the first box is 10 inches wide and the last 36 inches wide. The

first box contains the coarsest particle and the last one (36 in. wide) the finest which will readily settle. The water which overflows from the last box goes into a settling tank. The discharge from the first spigot of the classifiers goes to 3 two compartment Hartz jigs; the discharge from the spigot goes to two Overstrom tables and one Wilfley table; the discharge from the third spigot to three Overstrom tables, while the discharges from the fourth, fifth and sixth spigots go to Overstrom tables as do also the slimes from the settling tank. The middlings from the Overstrom tables drop to the floor beneath and are treated again on Overstrom tables. The heads from the first and second jigs drop down to the roll floor and are reground by a set of 6x30 inch high-speed Colorado rolls; the heads from the coarse concentrating tables are also reground. These rolls grind the concentrates sufficiently fine to pass through a 2 mm. hole, whence they pass



View of Classifiers Designed by Prof. Richards.

to elevator No. 3 and are elevated 35 feet to another trommel of 2 mm. hole, the undersize dropping into storage bins while the oversize falls back into the rolls to be recrushed. There are five V-shaped storage bins, each of which have 25 tons holding capacity.

Concentration is now complete in the crushing section of the mill, and the material is taken from the grader room, by means of a conveyor belt, to a double-decked, steam-pipe dryer, where it is dried and dropped to another conveyor belt in the basement of the grader room, and conveyed to two elevators. No. 1 elevator carries up the concentrates as they come from the crushing mill, while No. 2 handles the concentrates after they have been re-washed on the Wilfley tables, while the material which is being treated on the Hooper jigs, of which there are three, also goes to the elevator. The unwashed (uncleaned) concentrates are conveyed by

No. 1 elevator to the top of the building where the magnetic iron contained therein is extracted by magnetic separators. The concentrates generally



Detail of Interior Grader Building.

carry from 10 to 15 per cent. of this iron. After going through this process of magnetic separation the concentrates are carried down to the splitters and graders. The iron from the magnetic separators is meanwhile dumped outside for future treatment, as it still contains a percentage of corundum. The concentrates, having passed through the splitters and graders, go to small bins beneath the graders, and are then treated on the rewashing tables and Hooper jigs, dried, and conveyed to No. 2 elevator together with concentrates from the Hooper jigs. This product is carried over two finishing magnetic separators, again passed through the splitters and graders and falls into bins below, having been graded into twenty different sizes of from 8 to 200 mesh. It is then sacked ready for shipment.



Interior of Grader Building—A Nearer View.

The Company's power plant consists of three return tubular boilers (in a separate building), and two Corliss engines. Rope transmission is em-



ployed from the engines to the shafting, and a rope drive from the crushing mill to the grader room. A rope drive also operates a Root's pump in the basement of the grader room. This pump supplies all the water used in the mill, excepting that required for the classifiers, the latter being supplied by a duplex steam pump. The classifiers were installed during a suspension of milling operations in the spring, at which time the shafting and building were also strengthened. The Company now contemplates installing one or two additional sets of trommels, a pump and two additional magnetic separators.

south-western portion of the Yukon district. The presence of gold in this region was first made known in 1903 and a large number of streams were examined on which numerous claims were staked. Mr. McConnell writes: "The area of coarse gold discovery extends along the base of the St. Elias range for a distance of over seventy-five miles and has a maximum width of about thirty miles. Careful descriptions of the country and geological conditions and mode of occurrence of the gold, as well as indications of the auriferous streams of the St. Elias range, are described, reference being also



Corundum Mining in Ontario—Machine Drill at Work in one of the Canada Corundum Co.'s Quarries.

## THE GEOLOGICAL SURVEY OF CANADA.

### Economic Work in 1904.

(Specially Contributed.)

The Summary Report of the Geological Survey of Canada for the calendar year, 1904, contains, besides thirty-eight pages of an introduction, or preliminary report, by Dr. Bell, the acting director of the survey, 392 pages of text, accompanied by maps, charts, sections, and diagrams illustrating the work of exploration and investigation carried on during the past twelve months.

The first report is that of Mr. McConnell, who carried on investigations in the Kluane area, in the

made to the discovery of other minerals, such as lead, native copper, copper pyrites, and lignite coal. The last is stated to be "of excellent quality, burning freely in an ordinary Yukon box stove." Lignite also occurs in Kimberley Creek.

### THE DUNCAN CREEK COUNTRY.

Mr. Joseph Keele was in charge of the geological survey along the Stewart River in the Yukon Territory. Though occurrences of gold had been known to Ogilvie in 1887, it was not until 1898 that prospectors made their way up the Stewart River. In 1901 a discovery was staked on Duncan Creek. Since the Klondike was made known, this is the

most important discovery made in the lower Yukon country. Hematite, scheelite, zinc-blende, copper-pyrites, stibnite, are some of the minerals associated with the gold in this region. Quartz mining promises well in some localities.

#### NICOLA COAL BASIN.

Dr. R. W. Ells then follows with his report of geological investigations in the southern interior of British Columbia, more particularly in what are now termed "the Nicola and Quilchena coal basins."

Coal had been expected in this region by Dr. Dawson, as stated in his reports of 1877-78 and 1894, respectively, and Dr. Ells has found that the possibly productive coal areas of the district could be arranged into four groups, viz.: (1) that of the Lower Nicola or Ten Mile Creek basin, about three miles below Coutlee; (2) that of the Coal Gully, containing several seams, one of which has been opened up and mined locally for some years; (3) the Coldwater seam, about a mile and a half to the east, where one seam is exposed in two outcrops on the bank of the stream, at an interval between the two exposures of nearly a fourth of a mile (these two are sometimes known as the Garesche Green area), and (4) the Quilchena Basin, which is entirely separated from the others and distant about ten miles to the east.

The length of the main coal basin of the Nicola-Coldwater area, from the foot of Nicola Lake to the south limit on the Coldwater, in a southwest direction, is about ten miles, and the greatest breadth is about three miles. The best natural section of the coal-bearing strata is seen in what is called Coal Gully, a small stream and a ravine situated about one mile and a half south of the Coldwater seam. Dr. Ells refers to two bore holes put down to test the localities, one near Coldwater and the other about two miles east on the bank of the Nicola River. One seam, three feet eight inches, was struck in the former, followed downward by two smaller seams, in all two inches thick. In the Nicola boring the seam was struck at 137 1-2 feet.

Four coal seams are displayed on Coal Gully. It was from this locality that Dr. Dawson, in 1877, obtained the section which gave alternating bands of sandstone with coal seams, the latter measuring respectively 15 ft. 4 in., 5 ft. 4 in., 3 ft. and 2 ft. 5 in. A section given by Dr. Ells from the tunnel run along the coal for 85 ft. gave: coal seam, 5 feet; shale parting, 1 ft. 6 in., and coal again, 13 ft. --in all 18 feet of coal and a foot and a half of shale parting. Dips of strata accompanying coal seams and faults were noted in the field and coal is said to appear to be of good quality, yielding large blocks, and has been mined for years for local consumption. Coal seam No. 2 holds coal 5 ft. 3 in., shale 4 ft., and coal 4 ft.

Analyses of these coals carried on in the geologi-

cal survey laboratory has shown the presence of fixed carbon in four samples to vary from 47 per cent. to 55 per cent., an average of 52 per cent. The Ten Mile Basin is then described and also boring operations in the Nicola-Coldwater Basin.

The Quilchena Coal Basin is in large part owned by the Diamond Vale Coal and Iron Mines, Ltd. The basin extends southward along the creek from Quilchena for about eight miles, with a maximum breadth of two and a half miles. The geological structure of the Nicola-Coldwater Basin also obtains in the Quilchena Basin. One seam on this property, about six feet in thickness, is recorded by Dr. Ells, whilst on the west side of Quilchena Creek a broken seam of coal with a thickness of about three feet is reported. The Tunnel or Jackson seam, about six feet in thickness, is described and elevation given with notes on the occurrence of other coal seams with various kinds of strata between. The Palmer or Camp seam; "as exposed in the Gully, there is here a thickness of about fifteen feet of coal." For surface snowings, Dr. Ells describes the coal as of "good quality." Six companies are now owning mining areas in the Nicola Basin: The Nicola Coal Co., Ltd., The Coutlee Coal and Iron Co., the Nicola Coal and Iron Co., The Nicola, Kamloops and Limitkameen Coal and Railway Co. The C.P.R., (owning bases chiefly east of the Coldwater River), and the Diamond Vale Coal and Iron Mines, Ltd. Tables of bore-holes and materials struck there accompany the report.

Mr. R. A. A. Johnston gives notes on the different copper claims on which development work has commenced. On Big Sioux claim a shaft has been sunk 28 feet and a quantity of low grade ore has been raised. Aberdeen Camp and Iron Mountain areas are also described by Mr. Johnston.

#### LARDEAU MINING DISTRICT.

Professor R. W. Brock, of Queen's University, reports on his investigations in the Lardeau district, preliminary to which he made an examination of the Selkirk series of rock from Glacier to Revelstoke, along the Illecillewaet River. The character of the country along the Duncan, Lardeau and Kootenay valleys is described, including the geology of the glacier or ice-clad region, so famous for Alpine tourists and sight-seers. The geology of the solid rocks having been given, Prof. Brock deals with the mining geology and mining, giving details of the structure of the rocks and mode of occurrence of the minerals on the various claims examined within this area.

The ore of the "American" claim is described as quartz, calcite, hornblende and spattue iron, carrying galena, blende and gray copper. The "Wagner" claim, at an altitude of 8,000 feet, "on the Swede group at Poplar Creek, a considerable amount of surface work has been done, which has thrown a



good deal of light on the occurrence of gold." Minute descriptions are then given of the mode of occurrence of the gold and associated minerals, which deserve careful perusal. Gold, silver, copper and blende, galena and pyrite are treated at the silver mill on the south fork of the Lardeau Creek.

#### CASCADE AND COSTIGAN BASINS.

Mr. D. B. Dowling's report on these coal basins then follows. In it he describes the work done in the Bow River Valley and the geological investigations in the Cascade Basin. The report is accompanied by a map of the district showing the extent and distribution of the coal areas in question. Estimates of the amount of coal are given, also notes on the character of the coal and its relation to geological position, the older or lower coals being the best and richest in fixed carbon. The Costigan Coal Basin is then described and characteristics of the Costigan seam indicating other seams occurring there.

Analyses of the coals collected by Mr. Dowling and others are published, showing clearly the high grade and quality of the coal.

#### HEAD WATERS OF THE ALBANY RIVER BASIN.

In Mr. W. J. Wilson's report on that heretofore unexplored region lying east of Lake Nipigon along the head waters of the Little Current and Drowning Rivers, iron is reported in small quantities to the east of the Little Current River, below O'Sullivan Lake. A typical Huronian mineral bearing belt traverses this district.

#### THE GEOLOGY OF THE BRUCE MINES.

These mines, which have just been purchased by a British syndicate, were the subject of a special geological investigation and study last season by Mr. E. D. Ingall, Chief Engineer of the Mines section of the Geological Survey of Canada, and Mr. Theo. Denis. These two officers carried on surveys and traced out the outcrop of the various sedimentary intrusive formations, as well as roads and coast lines of lakes and rivers and prepared a final map covering "seventy square miles, which included the Bruce and Wellington group of mines." The estimated thickness of the Huronian rocks are given for this district as 18,000 feet and are represented as lying on the Laurentian, and as overlain by the Lower Silurian of the Palaeozoic. Basic intrusives whose economic importance cannot be estimated in studying such a mining region are described and were carefully mapped and their limits defined; the limestone occurrences are also given, and the areas of diabase intrusives described. In sedimentary series, no economic deposits so far are known to occur, although, for local application, quartzites, limestones and even slates may prove to be of considerable economic value. The Wellington & Huron Copper Bay mines were exhaustively investigated,

The copper occurs in the form of different sulphides, chiefly chalcocite in a gangue of quartz. A careful description of the workings and their extent is given.

#### CORUNDUM IN ONTARIO—GEOLOGICAL SURVEYS IN TEMAGAMI REGION.

After completing his exhaustive "Report on the Nickel and Copper Deposits of Sudbury, Ontario," Dr. Barlow devoted part of his time to preparing a report on "The occurrence of corundum in Canada," with special reference to the economic importance of this mineral. It is a noteworthy fact that the bulk of the output of corundum in the world to-day comes from Canada. The corundum mineral belongs to an "intrusive complex, the products during crystallization of a highly alkaline and aluminous magma." This merely means that the constituents of the corundum were all mixed up in the old lava and igneous masses of the earth's crust in old Archæan times, and when this crust cooled and the true crust was formed, each mineral crystallized by itself, and, to-day, the corundum crystals can be clearly seen embedded in the Syenites and gabbro of varying types. The various accessory minerals found along with corundum form a long list of species, many of which are rare, and some of economic value. Some of these may even be classed among gems or precious stones. The origin of corundum is given, showing clearly its development or a primary constituent. The chemical analyses so far prepared by Mr. M. F. Connor, prove the accuracy and application of "the law formulated by Morozewicz from his observations of the behaviour of the cooling of magnias artificially produced. The manner of production and uses of corundum are described in this report.

#### COBALT-SILVER DISTRICT—LAKE TEMISKAMING NORTHWARD.

Dr. Wm. A. Parks, of Toronto University, who was engaged on geological work during the summer season of 1904 in the region north of Lake Temiskaming, reports that he proceeded to Haileybury, and, inasmuch as Prof. W. G. Miller was investigating the cobalt-silver areas to the south and west, Dr. Parks made arrangements to examine the country northward to the height of land, paying particular attention to the extent of the silver-bearing series, but not neglecting the features usually dealt with in a general geological report. (As his report is of particular interest, at present, we shall present its main features in our next issue.)

Analyses of the ores show clearly the unprecedentedly high value of these Temiskaming ores in silver.

#### MINERALS OF THE OTTAWA VALLEY.

Mr. C. W. Arillinott has prepared a brief summary of some of the rarer occurrences of minerals in

this portion of Canada. Special attention is directed to the occurrences of lepidolite, fuchsite and translucent serpentine, the economic importance of which is not yet sufficiently appreciated in Canada.

#### GEOLOGY OF PART OF THE COUNTRY OF OTTAWA.

Prof. Ernest Haycock, of Acadia College, Wolfville, Nova Scotia, was engaged on special work in the townships of Templeton, Wakefield and Portland, north of Ottawa. Nine types of rock masses were examined and with much difficulty mapped out owing to the variety and extent of the outcrops. Although at present the mining industry in the district is very quiet, the deposits of merchantable mica do not appear in any way exhausted. Even the old pits formerly worked for phosphate, when cleaned out, as some have recently been at Battle Lake, give very promising shows, and new ones are still being discovered. One such find, about three-fourths of a mile east of Dam Lake, in the Gore, was opened during the summer, and was showing very large crystals of excellent mica. When last visited, buildings were being erected, and other preparations made for its vigorous development. There seems no reason to doubt that, with a regular demand for the product, these rocks will continue to yield steadily for an indefinite time.

Mr. J. F. E. Johnston was also occupied in this region, visiting the township of Wakefield, Denholm, Bowman, Villeneuve and Derry, which district is practically divided into two parts by the Lieure River. Topographical features are described and the principal types of rock indicated in the different areas. Asbestos, gneisses, crystalline limestones, phosphate of lime and mica occur in the district. The last two are important. The pyroxenite rocks apparently invariably run with the phosphate bearing.

#### THE COPPER-BEARING ROCKS OF THE SHERBROOKE DISTRICT, QUEBEC.

Prof. J. A. Dresser conducted an examination of the various copper-bearing rocks of the Sherbrooke district, and made a special examination of a bog-iron deposit, near the village of Stanfold.

#### CERTAIN ECONOMIC MINERALS OF NEW BRUNSWICK.

This subject is dealt with by Prof. L. W. Bailey. Manganese deposits occur at the Falls of the Tattagouche in Gloucester, and at Dawson in Albert County. The Intercolonial Copper Company's property, near Dorchester, in Westmoreland County, was visited, and is described. The comparative scarcity of mineral fuel and the enhanced price resulting therefrom have not only proved a stimulus to the energetic working of known coal deposits, but have led to a reopening of the whole question of the productive capacity of the New Brunswick coal fields. As to actual operations, these are at present

practically confined to two distinct areas, viz.: (1) that of the Grand Lake district, and (2) that of Coal Branch in Kent County.

At Dover about twenty wells have been opened, it is said, which have, in some instances, given a yield of from twenty-four barrels daily. The oil is reported to come to the surface alternately with a very strong brine, from which it naturally separates in the tanks as the result of its lower specific gravity.

The crude oil is of a dark green colour, its composition being:—

|                                    |      |
|------------------------------------|------|
| 68 to 70 gravity naphtha.. . . . . | 5.5  |
| Refined oil distillate.. . . . .   | 27   |
| Wax distillate.. . . . .           | 37   |
| Cylinder stocks.. . . . .          | 29.4 |
| Loss.. . . . .                     | .008 |

Dolomites of high quality from the St. John Valley, used in sulphide pulp manufacture, have displaced the same material which was wont to be imported from Ohio.

#### GEOLOGY OF THE COUNTIES OF CUMBERLAND, HANTS, KINGS AND ANNAPOLIS, NOVA SCOTIA.

Mr. Hugh Fletcher reports occurrences of iron ore near Grand Pré Station; magnetite on Blackwell Mount; red marl and red amygdaloid for paint near Chipman Brook. He refers to drilling operations that have been going on, revealing a nine-foot seam (it is said) north of Fullerton Lake at a depth of 2,350 feet. The report includes an account of coal in Hants County, and describes the Port Parien mines, the Broughton colliery and the Cossitt mines, Sydney. There is also a note on the Barachor's iron mine, and occurrences of materials used in the manufacture of fire-bricks and pottery are given.

Mr. Fletcher reports that coal mining in Cumberland is being vigorously prosecuted and preparations are being made for still more extensive operations at most of the mines.

#### GOLD FIELDS OF NOVA SCOTIA.

Mr. E. R. Faribault of the staff has had charge of this work in the Province of Nova Scotia for many years. He is preparing a special report on the gold fields of Eastern Nova Scotia, which, it is hoped, will soon be ready for publication. A detailed survey of the gold mining district of Leipsigate in Lunenburg County was meanwhile made.

#### CHEMISTRY AND MINERALOGY.

Dr. G. C. Hoffman's report deals with an account of analyses of fuels from various localities, of copper ore, iron, nickel and cobalt, lime, clays, mineral waters, Yukon gold, pumice stone, etc. The additions made to the collection during the year are recorded and a statement is published of the work performed by Mr. C. W. Willimott, in preparing col-



lection of minerals and rocks besides carrying out a series of experiments with ochre.

#### THE MINES' SECTION.

Mr. E. D. Ingall, on behalf of the Mines' Section, in which he is ably assisted by Mr. McLeish, reports that the value of the mineral production of Canada for 1904 was \$60,343,165.

The report closes with an appendix to the Mines' Section Report, by Mr. M. F. Connor of the Assay Branch of the Geological Survey, and three small appendices by Dr. Ami of the Palaeontological division, on the geological position of various strata containing organic remains from various localities in the Yukon, North West Territories and Nova Scotia.

#### THE ELECTRIC SMELTING OF ZINC ORES.\*

By Frederick T. Snyder.

The present method of smelting on a lead basis ores containing gold and silver, consists in fusing in a blast furnace a mixture of ores containing approximately 30 per cent. silica, 20 per cent. of the oxides of iron and manganese taken together, 25 per cent. of alkaline earths, 5 per cent. of sulphur, 5 per cent. of zinc and 10 per cent. of lead. A modern furnace will handle 200 tons of such a mixture per day. The product of smelting this daily charge will be about 170 tons of slag, 6 tons of matte to be re-smelted, and 19 tons of lead, the lead carrying approximately all of the gold and silver which was in the various elements of the charge.

The zinc in the charge, amounting to 10 tons per day, does not appear in the product, it having been forced into the slag and thrown away. In general, at the average smelting plant, it is a commercial requirement that the furnaces should smelt and waste as much zinc in the slag as is technically practical, the reason being that lead and precious metals can be purchased more cheaply when contained in a zinc ore than when occurring in other forms of ore. The practical limit to the amount of zinc which can be slagged off is about 10 per cent. If more zinc than this is put into the charge a portion of it will be reduced to the condition of metallic zinc, which will be volatile at the furnace temperature. This volatile metallic zinc, meeting the oxygen of the blast, is oxidized to zinc oxide. Such zinc oxide being infusible, accumulates in the furnace, clogs it up, and stops the process of smelting. If it were not for the oxygen of the blast, both metallic lead and metallic zinc would be produced at the same time. If removed from the furnace in a metallic form, the value of the zinc which might be recovered from an average furnace charge would about equal half of the lead produced at the same

time, and would exceed per year the first cost of the smelting plant.

The heat needed to smelt such a charge is usually obtained by the combustion of coke inside of the furnace. A blast is forced into the furnace to furnish the oxygen required for this combustion. If this coke were burned outside the furnace, and the resulting heat separated from the gaseous products of combustion and transferred within the furnace, the volatilized zinc would not meet the blast, and escaping oxydization, might be condensed and removed in metallic form. Electricity forms a possible way of doing this. If the coke be burned under a boiler, most of the heat of its combustion will be transferred to steam. A part of the energy of this steam can be changed through the medium of a steam engine and dynamo into electricity. Almost all of the energy of this electricity can be delivered into the furnace as heat. Another way of doing it would be to burn the coke in a gas producer and use the resulting gas to drive a gas-engine dynamo combination. In such a way more of the total energy in the coke would reach the furnace.

In average modern practice, 250 pounds of coke are burned per ton of charge. Ten pounds of this coke are required chemically inside the furnace for the reduction of lead. No blast is required for the burning of this part of the coke, as the oxygen is furnished by the lead oxide. Of the balance of 240 pounds, part would be saved in burning the fuel outside the furnace. To burn this amount of carbon inside the furnace requires the introduction of 2,700 pounds of air. To heat this air from an average atmospheric temperature to 400 degrees F., at which gases escape from the furnace top, requires the combustion of 19 pounds of coke as burned inside the furnace. When coke is burned inside a furnace, the combustion is not complete, and the gases as they issue at the top carry off an amount of chemical energy per ton of charge equivalent to the combustion of 76 pounds of coke under present conditions. If these losses be deducted there remains 145 pounds of coke whose heat of combustion would have to be put into the furnace electrically to enable a furnace to run on the present basis without blast.

Under conditions of good average modern practice, 70 per cent. of the heat in fuel burned under a boiler will be transferred into steam; 17 per cent. of the heat energy in the steam could become mechanical energy in a steam engine, and 90 per cent. of this engine power can be delivered from a dynamo as electricity. Of the energy of this electricity, 90 per cent. will become heat again inside the furnace. As the total of this cycle, some 10 per cent. of the heat energy of the fuel would be delivered into the furnace, freed from all gaseous products of combustion. If a gas producer and gas engine dynamo system be used, some 15 per cent.

\* Trans. C.M.I., March, 1905.

of the total heat in the fuel will reach the inside of the furnace. With such a gas producer, gas engine dynamo plant there would have to be consumed in the gas producer 970 pounds of fuel to put into the furnace electrically the same amount of heat that would be obtained by burning 240 pounds of coke inside the furnace by means of a blast. The fuel used in such a gas producer might be bituminous coal or wood. In practice some 45 pounds of fuel are consumed, per ton of charge smelted, in producing the blast; this fuel might be applied to the production of electricity, leaving 925 pounds of fuel to be supplied in place of the 240 pounds of coke, if the furnace was to be run without blast and produce the present products.

If the zinc is to be condensed and saved, in whole or in part, other heat items are involved. Under present conditions, the zinc, per ton of charge, carries into the slag, in the form of zinc oxide, the sensible heat equivalent of 11 pounds of fuel. To reduce this zinc oxide to metallic zinc would absorb an amount of heat equal to the complete combustion of 16 pounds of fuel. This metallic zinc would be volatile at the furnace temperature. If it were all removed and condensed, it would carry away with it the possible heat of combustion of 3 pounds of fuel. The reduction of the 100 pounds of zinc in a ton of charge would produce 43 pounds of carbon monoxide. The carbon monoxide from the zinc would carry away as sensible heat the equivalent of burning 2 pounds of fuel. As a net result, to save the zinc in such a way would require in addition the combustion energy of 10 pounds of fuel for each 100 pounds of zinc. When zinc is saved in this way there is required a further amount of heat to replace the potential energy carried out of the furnace by the carbon monoxide from the reduction of the lead, as  $\text{CO}_2$  could not be formed. This would be equal to the heat energy of about 3 pounds of fuel for each 200 pounds of lead in the charge.

If two-thirds of the zinc in a standard charge were saved, the extra heat requirement per ton of charge would be the total heat of combustion of 10 pounds of fuel, and this might be obtained electrically by burning 67 pounds of fuel in a gas producer. Adding these additional fuel requirements to the 925 pounds of fuel required to eliminate the blast from the present process, makes a total of 992 pounds of bituminous coal that would be required in place of 240 pounds of coke to recover 66 pounds of metallic zinc. If the original charge had contained 20 per cent. of zinc and 10 per cent. of lead there would be required in the gas producer 1,120 pounds of bituminous coal to recover 260 pounds of zinc, and at least 240 pounds of coke of the present process would be eliminated.

If water power is available, the gas producer and gas engine might be replaced by a water-wheel.

With a well designed installation, under average conditions, there might be realized in mechanical power on the water-wheel 75 per cent. of the power of the water. Of the mechanical energy, 90 per cent. would be delivered by the dynamo as electricity, and 90 per cent. of the energy of this electricity would become heat in the furnace. Saving 66 pounds of zinc from a ton of charge carrying 5 per cent. of zinc would require 1,429 horse-power hours in the water, or 650 kilowatt hours of electricity delivered in the furnace. Saving 260 pounds of zinc from a ton of charge carrying 20 per cent. of zinc would require 1,607 horse-power hours in the water, or 731 kilowatt hours of electricity delivered in the furnace.

On the basis of the rating of the water-wheels, the 5 per cent. charge would require a plant of 45 horse-power for each ton of charge capacity per 24 hours. The 20 per cent. charge would require water-wheel capacity of 50 horse-power per ton of charge smelted per 24 hours. On the basis of the rating of engine output, the steam or gas plant capacity required would be practically of the same horse-power as the water-wheels. In each of these cases, the 240 pounds of coke and 45 pounds of coal used in the present process would be eliminated.

### CALCULATIONS.

#### Heat Carried Out of Furnace by Blast.

400 F.....Temp. gases from furnace.

70 F.....Temp. atmospheric air.

Specific heat air constant pressure = .24

Heat per pound air =  $(400 - 70) .24 = 79.2$  B.T.U.

200 ton per day furnace requires 5,000 cu. ft. air per minute.

$$\text{Lbs. of air per ton ore smelted} = \frac{5000 \times 60 \times 24 \times 75}{200 \times 1000} = 2700$$

$$\text{B. T. U. per ton ore smelted} \dots = 2700 \times 79.2 = 213,800 \text{ B.T.U.}$$

$$\text{B. T. U. per lb. coke} \dots \dots \dots = \frac{214,200}{4200} + \frac{4200}{3} = 10,900$$

$$\text{Pounds coke per ton ore smelted} = \frac{213,800}{10,900} = 19.6$$

#### Chemical Energy Lost in Furnace Gases.

Burning to 2-3  $\text{CO}_2$  and 1-3 CO in place of 3-3  $\text{CO}_2$ .  
Heat given out in burning 1 lb.

C to  $\text{CO}_2$  ..... = 14,200 B.T.U.

Heat given out in burning 1 lb.

C to CO ..... = 4,200 B.T.U.

Heat lost per lb. C by incomplete combustion ..... = 10,000 B.T.U.



$$\begin{aligned} \text{Heat lost per ton ore smelted..} &= \frac{250}{3} \times 10,000 \\ &= 830,000 \text{ B.T.U.} \\ \text{Coke equivalent} \dots &= \frac{830,000}{10,900} = 76.1 \end{aligned}$$

**Steam Engine Efficiency.**

42 B.T.U. per min. = 1 H. P.  
 18 B.T.U. per min. in each lb., 150 lbs. steam per hour  
 Average practice, 14 pounds

$$\text{Pounds steam per h.p. hour} = \frac{42}{18} = 2.33 = 100 \text{ p.c. efficiency.}$$

$$\text{Average practice efficiency} \dots = \frac{2.33}{14} = 16.7 \text{ p.c.}$$

$$\text{With 12 pounds efficiency} \dots = \frac{2.33}{12} = 19.4 \text{ p.c.}$$

$$\begin{aligned} \text{Mechanical efficiency engine} \dots &= 85 \text{ p.c.} \\ \text{Total efficiency at 12 lbs.} &= 85 \times 19.4 = 16.5 \text{ p.c.} \\ \text{Total efficiency at 14 lbs.} &= 85 \times 16.7 = 14.2 \text{ p.c.} \end{aligned}$$

**Gas Engine Efficiency.**

$$\begin{aligned} 1 \text{ ton coal} \dots &= 30,000,000 \text{ B.T.U.} \\ 1 \text{ pound coal} \dots &= 15,000 \text{ B.T.U.} \\ 1 \text{ h.p. hour} \dots &= 2,545 \text{ B.T.U.} \end{aligned}$$

$$\text{Theoretical efficiency} \dots = \frac{2,545}{15,000} = 17 \text{ p.c.}$$

$$\begin{aligned} \text{Net efficiency heat} \dots &= 17 \times .90 \times .90 = 13.77 \\ \text{Possible gas engine efficiency} \dots &= 26 \text{ p.c.} \\ \text{Possible producer efficiency} \dots &= 85 \text{ p.c.} \\ \text{Possible power} \dots &= 85 \times 26 \times 85 = 18.8 \text{ p.c.} \\ \text{Electric power} \dots &= 18.8 \times 90 \times 90 = 15.2 \text{ p.c.} \end{aligned}$$

**Fuel Required to Produce Blast.**

5,000 cubic feet per minute for 200 tons per day,  
 48 oz. = 3 pounds pressure of air.

$$P_1 .29$$

$$P_2 - 1$$

$$\text{Ft. lbs.} = \frac{P_1}{.4} P_2 V_2 \quad \text{Where } P_2 \text{ is in lbs. per sq. ft. } + V_2 \text{ in cu. ft.}$$

$$\text{H.P. per cu. ft. free air per min. to 3 lbs.} = .025$$

$$\text{Cubic feet per ton ore.} = \frac{5000 \times 60 \times 24}{200} = 36,000$$

$$\text{H.P. hour per ton ore smelted} = \frac{36,000 \times 25}{60 \times 1000} = 15$$

$$\begin{aligned} \text{Cost horse-power hour} \dots &= \frac{3600}{360 \times 24} = \$.0042 \\ \text{Cost per ton ore smelted..} &= .0042 \times 15 = \$.063 \\ \text{Pounds coal per ton ore} \dots &= 15 \times 3 = 45 \end{aligned}$$

**Sensible Heat in Furnace Gases.**

$$\begin{aligned} \text{Weight of blast per ton ore} \dots &= 2,700 \text{ lbs.} \\ \text{Weight of coke per ton ore} \dots &= 250 \text{ lbs.} \\ \text{Weight of oxygen in lead} \dots &= 16 \text{ lbs.} \end{aligned}$$

$$\begin{aligned} \text{Total gases from furnace} \dots &= 2,966 \text{ lbs.} \\ \text{Sensible heat} \dots &= 2,966 \times 79.2 \\ &= 235,000 \text{ B.T.U.} \end{aligned}$$

**Heat in Lead from Furnace.**

$$\begin{aligned} \text{Temperature of lead} &= 1,000 \text{ degrees F.} \\ \text{Weight of lead} \dots &= 190 \text{ pounds} \\ \text{Sp. heat of lead} \dots &= .04 \text{ for fluid lead} \\ \text{Heat fusion lead} \dots &= 24 \text{ B.T.U. per pound} \\ \text{Sp. heat} \dots &= (1,000 - 100) .04 = 36 \text{ B.T.U.} \\ \text{Heat fusion} \dots &= 24 \end{aligned}$$

$$\begin{aligned} \text{Total heat} \dots &= 60 \text{ B.T.U.} \\ \text{Heat taken out by} \\ \text{lead, per ton} \dots &= 60 \times 190 = 11,400 \text{ B.T.U.} \\ \text{200 lbs. lead per ton smelted.} \\ \text{190 lbs. lead. per ton saved.} \end{aligned}$$

**Heat Radiated from Furnace.**

$$\begin{aligned} \text{Water required in water jackets—} \\ \text{Temp. at entering jacket} \dots &= 60 \text{ degrees F.} \\ \text{Temp. at leaving jacket} \dots &= 200 \text{ degrees F.} \\ \text{For furnace, 200 tons required} &= 20 \text{ gals. per min.} \\ &= 167 \text{ lbs. per min.} \end{aligned}$$

$$\begin{aligned} \text{Water required for jackets per ton charge} &= \\ \frac{167 \times 60 \times 24}{200} &= 1,202 \text{ pounds} \end{aligned}$$

$$\begin{aligned} \text{Heat absorbed} &= (200 - 60) 1,200 = 163,000 \text{ B.T.U.} \\ \text{Other radiation, 25 per cent.} \dots &= 42,000 \\ &= 210,000 \text{ B.T.U.} \end{aligned}$$

$$\begin{aligned} \text{Campbell shows 5 per cent. total} \\ \text{heat in fuel radiated from iron} \\ \text{blast furnace—} \end{aligned}$$

$$5 \text{ per cent. of fuel of lead furnace.} = 178,000 \text{ B.T.U.}$$

**Heat in Slag.**

$$\begin{aligned} \text{Total heat per ton} \\ \text{ore} \dots &= 250 \text{ lbs. coke} = 3,560,000 \text{ B.T.U.} \\ \text{Sensible heat carried} \\ \text{off by furnace} \\ \text{gases} \dots &= 235,000 \text{ B.T.U.} \end{aligned}$$

Chemical potential

heat in furnace

gases ..... = 830,000

Heat in metallic

lead ..... = 11,400

Heat radiated from

furnace ..... = 210,000

Total heat other than in slag..... 1,286,400 B.T.U.

Heat in 1,750 pounds of slag ..... 2,293,600 B.T.U.

Heat per pound of slag ..... 1,300 B.T.U.

Heat fusion slag = 600 B.T.U.

$$\text{Specific heat slag} \dots = \frac{1300 - 600}{2190 - 70} \times \frac{700}{2120} = 0.33$$

**Heat Carried to Slag by Zn.** $\text{Zn} + \text{O} = \text{ZnO}$ 

65 + 16 = 81

$$100 \text{ pounds Zn} = \frac{81 \times 100 \text{ ZnO}}{65} = 124.6 \text{ lbs. ZnO}$$

Heat = 1,300 × 124.6 = 162,000 B.T.U.

$$\text{Pounds fuel} = \frac{162,000}{14,200} = 11.4$$

**Heat to Reduce ZnO to Zn.**

Heat per pound Zn = 2,360 B.T.U.

Per ton charge .... = 100 × 2,360 = 236,000 B.T.U.

$$\text{Equivalent fuel} \dots = \frac{236,000}{14,200} = 16.6 \text{ pounds}$$

**Heat Carried Out by Zinc.**

Temperature of escaping Zn..... = 2,000 deg. F.

Temperature of ore charge ..... = 70 deg. F.

Specific heat Zn (2,000 to 100 F.).. = .08

Sp heat per lb. Zn = (2,000—70) .08 = 155 B.T.U.

Heat vaporization per lb. Zn..... = 200 “

Latent heat fusion per lb. Zn..... = 112 “

Total heat per lb. Zn..... 467 “

Heat for 100 lbs Zn = 46,700 B.T.U.

$$\begin{aligned} & \frac{46,700}{14,200} \text{ lbs. fuel} \\ & = 3.3 \end{aligned}$$

**Heat in CO from Zn.** $\text{Zn} + \text{C} = \text{Zn} + \text{CO}$ 

81 12 65 28

$$\begin{aligned} \text{Sp. heat per lb. CO} \dots &= (2,000 - 70) .23 \\ &= 444 \text{ B.T.U.} \\ &448 \times 28 \end{aligned}$$

$$\text{Sp. heat per lb. Zinc} = \frac{448 \times 28}{65} = 192 \text{ B.T.U.}$$

$$\text{Sp. heat per ton charge} = 192 \times 100 = 19,200 \text{ B.T.U.}$$

$$\begin{aligned} \text{Fuel required} \dots &= \frac{19,200}{14,200} \text{ lbs.} \\ &= 1.4 \text{ lbs.} \end{aligned}$$

**Heat Lost in CO from Lead Reduction.**

$$3,300 \times .058 = 193 \text{ B.T.U.}$$

$$\begin{aligned} \text{Pounds of carbon per} & \quad 12 \\ \text{lb lead} \dots &= \frac{12}{206} = .058 \end{aligned}$$

$$\begin{aligned} \text{Pounds of carbon per} & \\ \text{ton ore} \dots &= .058 \times 200 \\ &= 11.6 \end{aligned}$$

Energy from CO<sub>2</sub>... = 14,200 per lb. C.

$$\begin{aligned} \text{Energy from} & \\ (2-3 \text{ CO}_2 \text{ \& } 2 & \quad 1 \\ 1-3 \text{ CO}) \dots &= \frac{(14,200) \times (4,200)}{3 \quad 3} = 10,900 \end{aligned}$$

Loss per pound C.. = 3,300 B.T.U.

Loss per pound lead = 3,300 × .058 = 193 B.T.U.

$$\begin{aligned} \text{Loss per ton ore} \dots &= 193 \times 200 = 38,600 \text{ B.T.U.} \\ &38,600 \end{aligned}$$

$$\text{Fuel equivalent} \dots = \frac{38,600}{14,200} = 2.72 \text{ lbs.}$$

**20 Per Cent. Zinc in Charge.**

20 per cent. Zn = 400 lbs. per ton charge.

2-3 of 400 = 267 lbs. of Zinc saved.

$$\begin{aligned} \text{Fuel} &= \frac{267}{100} \times 10 + 3 = 26.7 + 3 = 29.7 \text{ lbs.} \end{aligned}$$

$$\text{Would require in gas producer} \frac{29.7 \times 100}{15} = 197 \text{ lbs.}$$

$$\text{Total required} = 925 + 197 = 1,122 \text{ lbs.}$$

**Electricity Required.**

145 pounds C to run present process.

5 per cent. Zn.

$$(16 - 11 + 3 + 2) \times \frac{2}{3} + 3 = 10 \text{ pounds C.}$$

$$\text{Total energy} = (145 + 10) \frac{14,200}{2,210,000} = 2,210,000 \text{ B.T.U.}$$

$$\begin{aligned} \text{Kilowatt hours} &= \frac{2,210,000}{3,412} = 650 \text{ K.W.H.} \end{aligned}$$



20 per cent. Zn.

$$(16 - 11 + 3 + 2) \frac{4 \times 2}{3} + 3 = 29.7 \text{ pounds.}$$

$$\text{Total energy} = (145 + 29.7) 14,200 = 2,490,000 \text{ B.T.U.}$$

$$\text{Kilowatt hours} = \frac{2,490,000}{3,412} = 731 \text{ K.W.H.}$$

Empirical formula for charge with 10 per cent. Pb.  
K.W. hours = 623 + 5.4 percentage of zinc in charge.

#### Water Power Required.

Water-wheel efficiency ..... = 75 per cent.  
Dynamo efficiency ..... = 90 per cent.  
Line efficiency ..... = 90 per cent.  
Net efficiency =  $75 \times 90 \times 90 = 60.8$  per cent.  
With 5 per cent. Zn.

$$\text{H.P. hours} = \frac{650}{.746 \times .61} = 1429$$

With 20 per cent. Zn.

$$\text{H.P. hours} = \frac{731}{.746 \times .61} = 1607$$

$$\text{H.P. plant (5 p.c. charge)} = \frac{1429 \times .72}{.24} = 44.7 \text{ H.P.}$$

$$\text{H.P. plant (20 p.c. charge)} = \frac{1607 \times .75}{.24} = 50.2 \text{ H.P.}$$

#### Engine Capacity Required.

Line efficiency ..... = 90 per cent.  
Dynamo efficiency ..... = 90 per cent.  
Combined efficiency ..... = 81 per cent.  
Engine capacity

$$(5 \text{ per cent. basis}) = \frac{650}{.746 \times .87 \times 24} = 44.7 \text{ H.P.}$$

Engine capacity

$$(20 \text{ per cent. basis}) = \frac{731}{.746 \times .81 \times 24} = 50.2 \text{ H.P.}$$

#### A NOVA SCOTIA COLLIERY.

(By Our Special Commissioner.)

The old Londonderry Iron Company, Ltd., now liquidated, had amongst its other assets the Chignecto colliery at Maccan, Nova Scotia, which, about two years ago, was bought by Senator Mitchell of Drummondville and his associates. Under the corporate name of the "Maritime Coal & Railway Company, Limited," the property was re-opened and re-organized. Many years ago the first opening on the seams was made by Mr. James Baird, chairman of

the Board of Examiners for the Province of Nova Scotia, who has been retained by the company, and the care and supervision of the property still remains in his competent hands. The property has now been developed to an extent which enables it to rank among the important producers of coal in the Province of Nova Scotia, although the huge production of the Cape Breton collieries, for many years now, has completely shadowed the production of the main land mines in the province.

The Maritime C. & R. Co. own, under lease, an area of four square miles of coal-bearing lands, but as the form of this area is somewhat irregular, being taken chiefly along the outcrop of the seams, there are slightly over five linear miles of the outcrop within the four square miles. The area extends southerly for a distance sufficient to give a length of slope of over 5,000 feet on the dip of the seams. It has recently been calculated that within its boundaries this corporation has a total quantity of over 20,000,000 tons of coal of which at least 12,000,000 tons are recoverable.



The Workmen's Cottages.

In the Post Office directory the colliery is known as Chignecto P. O., and the town is about two miles east-northeast of Maccan, a station in Cumberland County on the Intercolonial Railway. The company has built a branch line of standard gauge, about two and a half miles in length, which connects the colliery with the main line of the Intercolonial Railway at Maccan Station. The property is, therefore, advantageously situated in respect to local points of consumption, being eight miles from Amherst, 56 miles from Moncton and 68 miles from Truro. The Maritime C. & R. Co. also owns 2,200 acres of freehold land, and has set aside a portion as a town site upon which a fair-sized settlement has already sprung up. One of our illustrations shows the character of the workmen's houses which have been erected for the employees. At present 55 of these dwelling houses are occupied, and, in addition, there are two large boarding houses which provide accommodation for single men; all of these tenements are of neat design and are a credit to the company. Some of the employees have built houses for themselves upon land apart from the freehold owned by

the company. It is, perhaps, worthy of note that the class of labour employed at this colliery is unusually good, being much above the average found in the coal regions of Pennsylvania or Vancouver Island.

At the present time the output of the mine is in the neighbourhood of three hundred tons a day—a remarkably good showing when it is remembered that, at the time of the foreclosure proceedings on the property of the Londonderry Iron Co., Ltd., the greatest depth attained by the slope was about 600 feet, and that most of the coal had been mined from the rooms which had been opened. On re-opening the property it was found that it would be quite unsafe to attempt to utilize the old workings; Mr. Baird, therefore, showed his habitual acumen and good mining sense by sealing up the old workings from the main shaft and the air course, both of which were retimbered and carried down to the present depth of 1,400 feet. At 1,000 feet in the shaft the first level was turned off both to the east and the west, and it now has an aggregate length of

increased depth that has been obtained. A recent analysis gives the following figures:—

|                                   | Per cent. |
|-----------------------------------|-----------|
| Water.. . . . .                   | 49        |
| Volatile combustible matter.. . . | 41.61     |
| Fixed carbon.. . . . .            | 46.29     |
| Sulphur.. . . . .                 | 4.76      |
| Ash.. . . . .                     | 6.85      |

Total.. . . . . 100.00

which shows the coal to be a true bituminous, and, from the high percentage of volatile matter, would justify a presumption that the coal might be used for gas making purposes, but it has never been tested for that purpose.

Within the area owned by the company there are three distinct beds of coal. The first one, or top seam, has a thickness of about two feet and is of excellent quality, being low in both sulphur and ash, but by reason of its thinness and the fact that it is separated from the middle and bottom seams by a bed of sandstone of great thickness it has only been opened in a few places and is not being worked. At the eastern end of the area this sandstone is quite thin, being only about four feet in thickness, but towards the western end its width has increased until it measures from fifty to sixty feet; the coal is bright and hard.

The middle and bottom seams lie close together and are separated by a band of claystone which is usually from three to five feet thick and which has, nowhere as yet, exceeded eight feet in thickness. Like the sandstone parting forming the floor of the top seam this claystone is thinnest at the eastern end and thickens going westerly. The middle seam has a general average thickness of about four feet, the bottom seam averages fully five feet and in many places on the 1,000 foot level it shows over six feet of good coal. Below the bottom seam is a hard white sandstone or close grit which makes an admirable floor; it does not swell on weathering and forms a hard footing for the props. The bottom seam is the main commercial seam, producing in its lower portion a large, black, heavy, compact coal of excellent fibre, which stands up well without making much slack when cut and screened. The middle fifteen to twenty inches is a softer coal, having a duller lustre and a shorter fibre, and also a slightly different chemical composition, the percentage of ash being somewhat increased over that of the bottom coal. Above this band of softer coal there are two feet of good, black, lustrous coal, which in places is penetrated for short distances by small ribs of stone a quarter of an inch or so thick, but these ribs are not continuous and in many rooms the coal is entirely without them.

The roof of the middle seam is good; locally, it is called a "soapstone," but there is no magnesia in the rock, which is really an argillaceous sandstone or hard gritty clay bed and should, more properly, be called a claystone. The roof breaks in blocks, and does not shale off nor does it swell and buckle with absorbed moisture; in consequence the props



The Engine Room.

2,700 feet. At the bottom of the shaft (1,400 feet) a similar level was also turned off on both sides and to the same distances from the shaft; both the 1,000 and the 1,400 foot levels are connected with parallel air courses by the usual slants, making a first class circulation of air. Although the mine makes a small quantity of gas the air circulation is so good, and the gas is so thoroughly swept out, that naked lights are used throughout the workings.

From both levels balances have been driven to the rise at intervals of about 400 feet, from which entries have been made and rooms laid off, so that at the present time the faces available for winning coal are numerous, and a large output could now be obtained from the mine in a very short time. The superintendent appears to have desired to reserve his coal rather than to have made a large output, and there are, doubtless, several good business reasons for this policy. At the present time the property is in excellent shape to supply a large demand should such demand occur. The quality of the coal is excellent and has improved greatly with the



used are much smaller in diameter than in many other of the coal mines in the district and the cost of working is consequently somewhat less.

The strike of these coal beds is, as is quite usual in all coal seams, somewhat irregular, but the general average direction is south  $72^{\circ}$  East. The pitch of the seams also varies, ranging from  $34^{\circ}$  at the eastern end to  $60^{\circ}$  at the western boundary; the pitch of the slope is exactly  $38^{\circ}$  to the south-south-east. Numerous readings taken on the floor of the bottom seam showed but little variation, the extremes being  $38^{\circ}$  to  $42^{\circ}$ . In this section of Cumberland County faults are numerous in other well known properties, but the whole length of the coal bed on the Maritime property has shown no faulting, the only break found being one small "hitch" of about ten inches, which is found on the 1,400 foot level, but which completely disappears four hundred feet above on the 1,000 foot level.

The coal makes a strong, solid coke, which does not crush under a heavy burden and which, therefore, would make a valuable metallurgical fuel but for the high amount of sulphur contained. The results of a sample carload (which was properly washed) showed, however, that this sulphur could be readily taken out, the coke from the washed coal yielding less than one per cent. of sulphur; a good washing plant would enable the Maritime company to enter the ranks of the coke producers. The specific gravity of the coal is 1.37.

That the mine is remarkably free from gas has already been noted and this fact is, perhaps, the more remarkable when it is known that the fan (which is an intake) is only fourteen feet in diameter and the air pressure maintained, usually, one inch of water. The capacity of the fan at forty revolutions per minute is given as 32,000 cubic feet of air.

The mine makes but a very small amount of



View of Bankhead and Fan House, Chignecto Colliery.

The coal stands handling without making much slack, since the total percentage reported as made by mining, loading, tramming, handling, picking, and delivery to the shipping cars is less than twenty per cent. It also stands banking well, experience having shown that when banked for four or five months on the surface there has been very little weathering and a very small percentage lost as slack, nor does the quality appear to be affected. The main deficiency of the plant, as it stands at present, is in the existing screening plant which has not the capacity to handle and grade all the coal which could very easily be mined; it is, however, the intention of the management to remedy this deficiency at once and to make such bankhead arrangements as will enable the mine to output from six to seven hundred tons a day, properly screen it, and grade it into the desired sizes.

water, most of which is caught above the 1,000 foot level, but although the 1,400 foot level is so dry the non-friability of the coal, which has already been mentioned when speaking of the slack made, gives very little dust so that extraordinary precautions against dust explosions are unnecessary. Hose connections, however, are placed at intervals along the water column so that a supply of water can be obtained for sprinkling whenever needed.

The good character of the roof and the consequent light timbering needed has already been mentioned, the props run from four to six inches in diameter at the top end and are usually from seven to nine feet long. All the timber needed in the mine and all the lumber required for building purposes is cut from the freehold property owned by the company; for this purpose there is a complete saw-mill, which is only run when required. The bankhead is



shown in the accompanying photograph of a train which is being loaded with coal at the screening building. Of these there are two, each of which is equipped with an incline shaking screen and with sectional, moving, iron picking tables. The picking tables are of ample capacity for an output of five hundred tons in ten hours, but the screens make but one separation of the coal into round coal and culm, as they have but the one mesh which is one inch square; to make nut coal therefore requires a second screening which is done by hand labour. This deficiency could be very readily made up through the introduction of graded screens similar to those used in certain portions of Pennsylvania.

There are no provisions at the mine for bunkering or the storage of the screened coal against a shortage of cars, such as occurred last winter at the time of the snow blockade. When no storage is provided the colliery operations have to stop through inability to get rid of the coal after it is hoisted. The Maritime Coal & R'y. Co. is capitalized at \$2,000,000 and is officered by the Hon. William Mitchell as president, with Mr. David Mitchell as managing director. Only \$100,000 worth of bonds has been issued, so that the company at the present time is in an excellent financial condition. It has a ready market for its output and has realized very satisfactory prices for the coal sold. Wherever the coal has been used it has given great satisfaction for steaming purposes and is constantly in demand by factories.

The property is located in a charming bit of rolling farm country almost within sight of the tidal waters of the Bay of Fundy. The supply of water is excellent and the conditions for health of the best. The general appearance of Chignecto Village indicates prosperity and comfort and, as the prevailing winds fortunately take away from the village the dust and grime usually found about a colliery, it is somewhat surprising to notice the freshness of the verdure and the clean appearance of the gardens. Such properties as the Chignecto colliery make for a continuous tide of prosperity to the labouring classes on the main land of Nova Scotia, and the excellent administration so far has been proof against the labour troubles so common to coal mines; at the present time the company has over two hundred men on its pay sheets.

## ON THE EXAMINATION AND VALUATION OF MINES.\*

By John E. Hardman, S.B., Ma.E., etc.

(Continued from August issue, 1905.)

### Measurement of Quantity or Tonnage.

The engineer has next before him the determination of quantities, or the problems of measuring and tonnage.

It is generally accepted that the accuracy of calculations made upon ore bodies of large size is

subject to a variable factor of safety, and the matter of being "large" has to be governed by one's knowledge of the deposit, by its regularity, its development, and the experience of the examining engineer.

If an engineer of experience can measure and sample the four sides of a rectangular mass of ore, he can form an estimate, not absolutely accurate, but sufficiently so for commercial purposes, of the quantity of ore contained in that mass; in some cases he may be able to do so if only three, or perhaps even two, sides are seen; but in each of these cases a factor of safety must be employed, which will vary with the size of the block, and will be subject to an allowance covering errors arising from pinching of the width, from inclusions of waste rock, and from the presence of more or less oxidized zones which may occur within such a block. And therefore, the factor of safety, or allowance to be made, will depend first upon the size of the block, and, secondly, upon the character of the deposit, and in all cases must be determined for each deposit or block examined.

Mr. Arthur Winslow has aptly said that the amount of evidence to be required when estimating tonnage, and the classes into which such tonnage should be divided, must depend upon the general conclusions of the engineer as to the nature and general permanence of the ore bodies under consideration. There are deposits in Clear Creek County, Colorado,\* where the distribution of values is so even that a block measuring 300 feet by 100 feet can safely be assumed as homogeneous, yet in the same county there is an old mine whose irregularity of values was so great that a block of one-tenth the above area could not be safely calculated as being of a *certain* value.

Some clients desire the fullest presentation of all the facts, undertaking to form a conclusion independent of the engineer's, but upon his facts as presented; other clients are unable, or unwilling to do this, and prefer a summary of the engineer's conclusions. It has been the writer's practice to give the essence, or a summary of his conclusions, in a short space of a page or two at the beginning of the report, followed by an extended and detailed statement of all the facts as collected in the examination, and of the calculations and deductions which have been made from the facts obtained.

The engineer should require from a mine which has a small amount of lateral development, and which presents only small stoped areas, a smaller size for the blocks of positive ore than he would from a mine that has been well opened up, and that can show large stoped areas where values have been reasonably uniform in grade.

It is the exception to find an ore deposit with

\* Trans. Can. Soc. of C. E.

\* Stanley Mine, Idaho Springs; Two Sisters, Dumont.



regular outlines and well defined areas of pay ore; the usual circumstances disclose irregular areas with poor definition, irregular outlines and of very variable character. Some auriferous quartz veins of this country, both east and west, carry the precious metal in pretty sharply defined *pay streaks* which, however, have very irregular outlines, and may leave very large portions of any rectangular area of the deposit so poor in value as to be *commercially* barren. This is a prominent characteristic of Nova Scotia and Ontario gold veins. The nickeliferous pyrrhotites of the Sudbury region, while usually presenting irregular outlines and consequently indefinite areas, yet compensate by comparatively sharp lines between ore and waste; in this respect they differ markedly from the British Columbia pyrrhotites, which, as a rule, present no defined sharp boundaries either of pay ore or of mineralization, the "walls" being determined (as in the Le Roi Mine) in the assay office by the shrinking of values below the figures of possible profit. This is a necessary consequence of the character of the deposits, which are metasomatic, the replacement of portions of the eruptive country by the pyrrhotite proceeding in completeness from the centre outwards, or from the plane of the shear on both sides. The longitudinal and vertical limits of the pay ore of these deposits are sometimes more sharply defined than the lateral boundary, but, speaking broadly, their boundaries are not physical, but are a matter of values.

Almost without exception ore deposits are not only irregular in form and outline, but are irregular in value as well; the well-known Homestake and Alaska Treadwell deposits occasionally produce specimens of coarse gold, although the general tenor of these properties is remarkably low grade. The same diversity in contents is seen in the amygdaloid and conglomerate copper bearing belts of Michigan, Wisconsin and Isle Royale, as well as in the so-called "mass" copper properties.

By reason of these variations in value, shape and size, the examining engineer must, for each case, decide the boundaries as closely as possible, and plot the same upon his plans and sections.\* Having thus plotted the boundaries of payable ore as accurately as possible, the engineer now has to calculate the area of pay ore within each block of positive and probable ore. It should be, and is, unnecessary to say that "possible" ore has no connection with the estimation of tonnage; only ore which is "ready to be broken" can enter into measurements. The possible ore, or future possibilities of a mine must be dealt with separately, and, by preference, should be discussed only at the very end of the engineer's report. The technical ignorance of shareholders or

directors may otherwise ascribe blame to the examining engineer of which he is wholly innocent.

The different areas of pay ore having been measured, their conversion into volumes follows. In most cases determination of the third dimension for each area is not difficult, the average of all the widths measured being taken. But there are deposits, frequent in those of the "fissure vein" type, where the irregularity in widths observed throughout any extensive area, is so great in magnitude as to vitiate a general averaging of the widths measured. In such an event the engineer must have recourse to the resources of mathematics, and I may refer the reader, on this particular point, to the method of "revolved areas" as one which usually solves the difficulty of obtaining a correct third dimension from which to obtain the volume.

From the volumes which have been correctly calculated, the conversion is made into tonnage. Sometimes this conversion is made by using the weights per cubic foot, or Specific Gravities, which are found in the tables accompanying text books or engineers' reference books. Protest must be entered against this practice; the specific gravities given in such tables are obtained from pure, clean, selected specimens of the individual minerals, and the weights per cubic foot are calculated from such specific gravities. Now, in nature, one does not often meet with such clean, pure ores; there is always an admixture of other minerals; there are also frequently open or barren spaces arising from crevices and vugs; there are extensive density, such as dykes, horses, etc., which vitiate calculations made from such tabulated figures. It is better for the engineer to determine the average specific gravity of the ore himself on each examination, using for the purpose those portions of the assay samples which were rejected when quartering down, or the samples which were used in making sorting tests of the ores. For himself, in examinations requiring great accuracy, and in which large amounts are involved, the writer chooses to determine the specific gravity of each different class of ore, if such be met with in the mine. For an example, the Stanley Mine (in Colorado), is an aggregation of many claims including several veins of different mineralization; the area owned lies on both sides of Clear Creek, and the main vein which carries auriferous copper pyrites on the east end of the property has its chief values in silver-bearing galena on the west end, with mixed values in the centre. In this instance three different specific gravities were taken, one to be used for the vein mass on the east, one for the vein mass in the centre, and one for the vein mass in the west end.

As to the correction to be made for crevices, oxidations, vugs, etc., above referred to, it must be determined for each deposit, according to the observations made by the engineer during his examination.

\* See admirable article by E. B. Kirby, *Engineering and Mining Journal*, March, 1895.



As a general statement, such correction will be found to vary from six per cent. or seven per cent. for the veins of the North American Cordillera, to twenty per cent. or twenty-five per cent. for some of the bedded oxidized ores of Arizona and portions of the Southern States.

The tonnage having been obtained for each block of ore, both "positive" and "probable," and the average value of each block having been ascertained by sampling and assaying, the total gross value is readily obtained. But it remains to observe a caution which is, only too frequently, disregarded. The writer refers to the tendency of the inexperienced or ignorant to use the simple arithmetical mean or average of the assays made. Due correction or allowance must always be made for the comparative quantities in weights of the samples cut, representing the varying widths of the ore sampled. Mr. Rickard uses the phrase "geometrical mean" to designate the correct average obtained by making allowance for varying widths or "weight." This geometrical mean is the figure obtained by taking the sum of the products resulting from multiplying each width of the vein (where sampled) by its assay value, and dividing this sum by the sum of the widths in feet. The product of an assay in ounces by the width in feet is known as "foot-ounces;" in South Africa Mr. Denny and others take the width in inches, and call the product "assay inches." It matters not which name is used, but what *does* matter is that the width and the assay value must be considered together, if a width of one foot assays \$10.00 per ton, and a width of five feet assays \$2.00 per ton, and another width of two feet assays \$6.00 per ton, the true assay average, or assay per foot of width, is \$4.00 and not \$6.00.

The student interested is referred to a paper by Mr. G. A. Denny in the Institution of Mining and Metallurgy, and to Mr. T. A. Rickard's article before cited.

At the beginning of this paper the writer mentioned three questions as embodying the gist of what is required to be known as a result of a mine examination, and the last question was—"What additional amount of ore not measurable, is reasonably probable?" Such ore is now by common practice placed in the category of "Possible ore." The answer to this question, to have any close approximation to the truth, must depend upon the circumstances of each case and upon the personal equation of the engineer. The geology of the deposit and surrounding country, and the strong common-sense of the engineer, are the guiding factors. If the vein is traceable for some hundreds of feet on the surface, one may be justified in assuming its continuance for another hundred feet that cannot be seen; if the deposit has been worked to a depth of 700 or 800 feet, with continuing characteristics, an

additional depth of 100 feet may be predicted, but if it has been worked to, say, only 100 feet in depth, it would not be common sense to assume its continuance to indefinite depths.

The testimony that is obtainable in the mine that is under examination, together with such other credible testimony as can be obtained from other and deeper mines of similar character in the same district, are the only facts available; the engineer, with these facts, and with the geological structure of the deposit before him, must deduce his conclusions. If he be experienced and has the capacity in him, he may make a successful prognostication, but there are no *rules* for him or for others.

The strain of a careful examination is exhausting to the engineer, and his clients are not always heedful of the fact. They are usually impatient, and not infrequently parsimonious. But most engineers, having the pride of their profession, will not stint their work in consequence. Sampling, though always important if well and carefully done, is not in all cases the most important feature of an examination; there are engineers who do not *always* make a close sampling before submitting an accurate report.\* Often the geology of the district, and the evidence obtainable from adjacent properties are of equal or greater value. If known, the characteristics of the region in which the deposit is located will often supply the data by which the evidence collected in an examination may be judged. As examples, the limitations of the pay-shoots in Nova Scotia gold veins, the persistence of the deposit without notable "bonanza" in the Plack Hills region, the gradation from free gold to gold-bearing sulphurets in the Nelson district of British Columbia, may be taken.

(To be continued.)

#### GOVERNMENT BY ORDER-IN-COUNCIL IN ONTARIO.

To the Editor,—

Sir:—It is safe to say that such an aggravating, distracting and even ridiculous state of things as now obtains in the Cobalt district has never before been seen in any mining camp in this world. Our Minister of Lands and Mines advertises in the *REVIEW* and other papers, inviting prospectors to come to Northern Ontario to try their luck, and says among other things, "The mining laws of Ontario are liberal, and the prices of mineral lands low. Title by freehold or lease, on working conditions for seven years. There are no royalties."

This little paragraph sounds very well, but on the only mineral belt in the whole province, where there is any active interest in mining this year what do we find? Here is a true picture of the extraordinary condition of matters in that new and inter-

\* See letter of Geo. J. Bancroft, *Engineering and Mining Journal*, February, 1903.



esting camp, as taken from a letter I have received to-day from an old prospector there in his own plain words:—

"From a mining point of view, everything is in the worst possible state here. Not that the mines are at fault, but owing to the impractical changes in the Government regulations made by orders-in-council. It leaves every prospector in doubt as to whether he has any rights or not, and no man knows where he stands. The Government refuses title to any claim until it passes inspection, and very few claims pass. Everyone is afraid to spend money on his claim because he does not know whether it is his or not. Then no man will buy a claim, nor do anything until he gets a title and a title he can't get unless he has a developed or proved up mine. A "prospect" is nowhere, no matter how promising it may be. There are only fourteen properties, old and new, that have shipping ore in sight, but over seven hundred prospectors' licenses have been sold already this year at \$10.00 each or double the fee charged in British Columbia and even in the Yukon now. Besides, a man has to pay \$10.00 extra for every claim he takes up after the first one, and also \$5.00 for transferring a claim or any interest in it.

"The result of the whole muddle and uncertainty as to titles is that the few real capitalists who visited the district have left in disgust. They did not want to invest in law suits, or the chance of titles being passed by inspectors who have no practical knowledge of mining, and who have thrown open again nearly half of all the claims in the townships of Coleman and Bucke, or the entire mineral belt. But for a wonder, twenty days are given to appeal to the Minister of Mines. All the claims that have been thrown open are being protested by the parties who took them up, and who intend in many cases to test the matter, in the courts before giving up their claims. Of course, if a man has a shipping mine he is all right anyway, but the inspection of claims has knocked out everything else, and no one wants to buy now, though there was a lively demand for even more prospects until this novel obstruction was inflicted upon us.

"The worst thing of all, perhaps, is that a prospector's oath about the discovery of mineral on a claim is not taken here any more. We have heard a good deal about the "Ross Bible," but the present government of Ontario seems to have discarded even the Hebrew Bible in this district, though such a thing has never been heard of before for over nineteen hundred years in any Christian land."

Truly, the Whitney Government has made a bad start as far as mining is concerned, and it is to be hoped that no more ignorant experiments will be tried on the silver-cobalt belt.

Yours faithfully,

A. McCHARLES.

Sudbury, Sept. 20th, 1905.

To the Editor:

Sir,—Regarding the administration of mining lands in the Temiskaming district, the writer is heartily in accord with the steps the Ontario Government have taken to prevent the country being blanketed and gobbled up by speculators and boomsters. If such action had not been taken it is safe to say that by the first day of May last there would not have been a vacant piece of land within ten miles of Cobalt, and the country would have been practically sealed to the legitimate prospector. In the action taken, the Act has not been changed, but has merely been enforced; and where an imaginary hardship has been done to one, good has resulted to many, which I think is the object in view.

Under the present arrangement the original discoverer gets his find conserved to him. What more can he ask?

Three parties have been continually in the field since early spring prospecting for the writer, but so far no post has been planted, for the reason that no finds have been made.

The conditions at Cobalt are unique, and perhaps it is the first time in our country's history that a necessity has arisen for the rigid enforcement of the Mining Act; and I am pleased to see that the Government has been equal to the occasion. There is little doubt but that in the wake of Cobalt's wonderful production of silver, and the intense interest created, numerous wildcat schemes will be sprung on the innocent public, and many will fall victims, but if the requirements in regard to "discovery of mineral in place" had not been insisted upon, Cobalt would have become a hotbed of schemers and stock boomers, and this would not have been in the public interests.

Apart from the fact that it might be advantageous to this Province, if the Government would encourage the local treatment of its ores, I am not at present prepared to discuss the proposed revision of the Mines Act.

In conclusion, I wish to say that the inspectors who have been entrusted with the very disagreeable and thankless task of enforcing the Act, are above suspicion, and the Department has in them honest and faithful servants.

Yours faithfully,

W. G. TRETHEWEY.

Cobalt, Ont., Oct. 2nd, 1905.

## ELECTRIC SMELTING AND NEWSPAPER OPTIMISM.

To the Editor:

Sir,—During the last month (September) a number of papers throughout Canada, but chiefly in Western Canada, have contained articles predicting the greatness of Canada in the comparatively small space of a decade in a metallurgical way. And the particular metal whose metallurgy is to be thus expanded into an ornament of the Dominion is iron. The fact that almost all the newspapers con-

taining these optimistic writings allude to the presence of Dr. Heroult, in Ottawa, or Toronto, and that the bulk of them have also emanated from the Ottawa correspondents of the various big dailies, suggests that perhaps somewhere in among the cinders, or back of the woodpile, there is lurking an Ethiopian gentleman. The *Toronto Globe* and the western papers which cull largely from its columns, have contained interviews with Dr. Heroult and from him have extracted a voluminous mass of words, out of which appear one or two facts. The principal fact is that the first corporation on this side of the Atlantic to obtain a license from Dr. Heroult to use his process for the refining of steel has been the Holcomb Steel Company, of Syracuse, N.Y., which is credited with the laudable intention of investing one million of dollars in a plant whose output will range from 80 to 100 tons of metal a day, this metal consisting of tool steel and wire rod billets.

The papers go on to say an awful lot of balderdash and rubbish respecting the conversion of pig iron costing \$20.00 a ton into a steel worth \$200.00 a ton, for the insignificant sum of \$1.00. It will be remembered that just about twelve months ago there appeared and was distributed to favored individuals an excellent monograph on the electric smelting of iron ores and the making of steel, which was the report of the Commission sent to Europe by the Canadian Government in December, 1903, to report upon and investigate the different electro-thermic processes employed in the smelting of iron ores and the making of different classes of steel. This monograph on its appearance was unquestionably the most authoritative, complete and reliable compilation of all known data on the subject of the smelting of iron ores into iron and steel products by means of electricity. Various and competent iron and steel authorities, then, as previously, while expressing their admiration of the work which had been done on the Continent, still declined to consider electric smelting as any important factor in the immediate future of the iron or steel trade, and chiefly because of the difficulty of obtaining electric current at a sufficiently low cost to permit the commercial production of iron and steel thus made. In your own columns, early in the year of 1903, an editorial showed quite clearly that the road was not by any means smooth, and that the question of cost would undoubtedly operate to continue coke products as the principal commercial products in the field.

These various newspaper squibs and items have seemed to the subscriber to be quite in line with the ill-judged and optimistic statements about the wealth of British Columbia which were in vogue in Toronto newspapers during the five years from 1895 to 1900, and the *Globe's* correspondent strengthens this view when he talks such absolute rot and rubbish as is contained in one of his recent articles where he says that "the interior of Canada possesses no fuel, and the cost of transportation of the same to the iron fields of Central Canada is practically prohibitive." He goes on further to speak of the "immense deposits" of magnetite existing in Onta-

rio and Quebec. These "immense deposits of magnetite," so-called, are unknown to the press, that is to say, the authentic press, as diligent search of the volumes of the Canadian Geological Survey, and of the different provincial government reports has failed to discover even ordinary deposits of workable magnetite, but the item is mentioned simply as testimony to my hypothesis that all these articles appear to have for their ultimate aim the arousing of public sentiment in favor of electric smelting.

It is interesting to note that the *Globe* correspondent says that Dr. Heroult is *reasonably* certain that pig iron and high grade steel can be produced in Canada, but although he is "reasonably certain," in order to make himself *absolutely* certain he is going to conduct a series of metallurgical experiments for six months at Sault Ste. Marie in a plant which the Canadian Government is kind enough to erect for that purpose at an ultimate cost of something over \$15,000. But the correspondent shows his woeful ignorance of his subject when he proceeds to quote Dr. Heroult still further. The learned doctor is reported as saying that Canada now spends between \$50,000,000 and \$60,000,000 abroad in buying steel, and that the idea should be to make all that steel at home out of Canadian material by the means of Canadian water-power from Canadian labour. Manifestly, the bulk of these fifty to sixty millions of dollars, in fact over 90 per cent. is spent for the purchase of steel rails and structural steel. But if it is to cost one million dollars for a plant with a maximum output of 100 tons daily, I, for one, am of the opinion that capital for the manufacture of iron and steel by electricity will be slow in offering itself to any promoters of such a business. Can you not suggest through your columns to your readers that these puffs of new processes should undergo the test of time in this country before irresponsible newspaper writers attempt to make capital out of them. There are many things which Canada needs, and needs badly, far worse than she needs high grade tool steel and wire rod billets.

With apologies for the length of my letter, I am,  
Yours truly,

HARD SENSE.

#### PROPOSED REVISION OF ONTARIO MINING LAW.

To the Editor:—

Sir,—As I understand that the mining laws of Ontario are shortly to be submitted to the Legislature for revision, and that the views of mining men are invited, I should like to refer you to my paper read at the Toronto meeting of the Canadian Mining Institute, in March, 1904, dealing with the subject of mining laws in Canada. My main contentions are:

(1) That a strict working condition should be required of all locators of mineral areas, while unworked land should be taxed to the utmost limit. This, to my mind, is the simplest way to prevent



the tying up of mineral lands and to promote the development of the mineral resources of the Province.

(2) No royalty should be required by the Government. The product of the mine should not, in this respect, be differentiated from the product of the soil, or of the factory; for why should the miner be placed in a less favorable position than the farmer or the manufacturer? The imposition of royalties on mineral constitutes a remnant of barbaric custom, when all mines were owned by the sovereign.

(3) The methods followed in British Columbia, in the Yukon, and in other countries, requiring the locator of mineral land to immediately record the same with the Government agent of the district, has been found to work admirably, and might be adopted to advantage in Ontario.

Yours faithfully,

EUGENE COSTE.

Toronto, Ont.

### OUR LONDON LETTER.

(From Our Own Correspondent.)

Like a bolt from the blue came the intelligence that Mr. A. J. McMillan had been ejected from the directorate of the Le Roi by his fellow-directors, Sir Henry Tyler, Mr. G. S. Waterlow, and Mr. F. W. Rolt—a new comer. The announcement was made by Mr. McMillan himself in a communication to the press, which in view of its importance is enclosed herewith in case you may have room to publish it for the benefit of your readers. In his statements Mr. McMillan dealt with the developments which had led to his forcible retirement. Subsequently, he followed this up by a lengthy circular letter to the shareholders in which he criticised the position generally, explained his opposition to the amalgamation scheme, and his consequent differences with his colleagues. You will quite understand that these developments have caused a sensation here. In the absence of fuller details, it is impossible to arrive at a decision as to the merits of the points at issue, but the press on the whole has shown a tendency to take Mr. McMillan's side and to denounce the hasty manner in which the directors have acted in removing him from the board. Whether the explanation furnished by the board on Saturday last in the form of a "memorandum" will alienate support from Mr. McMillan remains to be seen. Certainly the cleavage between the late Managing Director and the Board as at present constituted, is pronounced, and the easiest way out of the difficulty will be to call the shareholders together, and let them decide the questions involved. Mr. McMillan can be left to prepare his own defence to the counter-statements made by the Board, and we are looking forward to a lively meeting next month, for, in view of their promise in the circular just issued, they cannot very well postpone it beyond that time. One of the remarkable things in connection with the Le Roi is the steady advance which has lately taken place in the price, which has been as high as £1 10s (say \$7.50), the highest point reached for a long time past. This movement, mysterious in itself, is no doubt largely due to extensive purchases in preparation for the coming fight for Le Roi, for if all I hear be true about the amalgamation proposals, these in their present form will mean the transfer of the balance of power to your side. However, it is idle to speculate upon this point, as the Board will probably hurry up their report and a full statement of affairs, and then we shall see what they have succeeded in achieving. Altogether it is a pretty kettle of fish, and not likely to increase public confidence in a market already sufficiently discredited.

Recently there has been something of a recovery in Tyee Copper shares, and another feature was the sharp spurt in Ymirs which, from being practically unsaleable two or three weeks ago at a few pence, have, on the publication of unexpectedly favorable developments, jumped to several shillings. Apart from these incidents, the market remains dull, although in many directions the opinion is confidently expressed that we have seen the worst, and that from now onwards we may look for a general and welcome recovery in all departments. Money may cause occasional tremors, but the political outlook is comparatively clear, for no one believes that the Moroccan business nor the Austro-Hungarian trouble will be allowed to come to a head. Four wars in ten years—not to mention trifling "Military Expeditions" for punitive purposes—have satiated East and West, and we are now anticipating a lengthy period of peace, during which the wastage caused by these conflicts may be made good.

### THE DISMISSAL OF A LE ROI DIRECTOR.

The secretary of the Le Roi Company has forwarded the following statement to the B. C. Review, of London:—

"Mr. E. Jewell, on leaving England for many months for the Argentine Republic, resigned his position as a director; Mr. F. W. Rolt has been elected to a seat on the board. Mr. A. J. McMillan is no longer managing director, and has ceased to be a director. Messrs. Bradley and Mackenzie have been requested to take charge of the mine pending arrangements for amalgamation, which will shortly be considered at meetings of the Canadian companies in Canada before being submitted to the shareholders of this company in England. Mr. Mackenzie will reach Rossland about the middle of the present month.

Mr. A. J. McMillan has published the following correspondence which explains itself:—

Salisbury House, London Wall,

London, E.C., August 28th.

Dear Sir Henry,—With reference to your request at the last board meeting that I should resign my position as a director of the Le Roi Mining Company, and that I should let you know my decision by the time the next board meeting is held, I wish to say that I cannot see my way to comply with your request.

At a time when the affairs of the company were in a desperate condition the shareholders of the Le Roi placed me on the board to look after their interests. During the time I have been a director—notwithstanding that many difficulties have been placed in my way—I have done my utmost to improve the position of the company's affairs, and this has been particularly the case for twelve months past, during which period I have for the first time been personally responsible for the management in British Columbia. The financial year just closed—at June 30th last—was one of the most successful in the history of the company—a year during which large profits were earned—and the Le Roi is to-day in a better position, financially and otherwise, than it has been for years past, probably better than it has ever been.

You tell me that my presence at board meetings is not agreeable, owing to the fact that the directors wish to discuss and proceed with amalgamation proposals which I do not approve, and you therefore suggest that I should resign my seat on the board. Believing as I do that the policy you and Mr. Waterlow are pursuing in regard to amalgamation, if persisted in, can end only in disaster to the Le Roi, I cannot consent voluntarily to resign the trust committed to my care by the shareholders, whose interests need protecting to-day more than at any time since I have been connected with the company.

In taking this position I am, of course, aware that if the directors wish to eject me from the board they have power to do so under the articles of association, and that without reference to the views and wishes of the shareholders.

(Signed) A. J. McMillan.

Sir Henry Tyler,  
Chairman Le Roi Mining Co., Limited,  
London, E.C.

## LE ROI MINING COMPANY, LIMITED

539b, Salisbury House,  
London, Wall,  
London, E.C.

To A. J. McMillan, Esq.

Pursuant to Article 108 (f), we, the undersigned, being all the other directors of Le Roi Mining Company, Limited, hereby request you to resign your office of director of the said company.

Dated this Thirtieth day of August, 1905.

H. W. TYLER,  
GEO. S. WATERLOW,  
F. W. ROLT,

Directors, Le Roi Mining Co., Limited.

The Board has meanwhile replied to Mr. McMillan's circular in the following "memorandum," dated Sept. 23:

At the general meeting on the 31st January, 1905, the shareholders of the Le Roi Mining Company agreed to the principle of amalgamation with other companies, after that question had been referred to at considerable length; and much time and labour has since been devoted to it.

The progress that has been made is, so far, satisfactory in the interests of the Le Roi Company, and the directors hope to be in a position to lay before the shareholders, at a meeting to be called, probably, in the coming month of October, a complete scheme, which cannot fail to meet with their approval, and to place them in the position of receiving regular dividends in the future.

But this scheme is in direct conflict with two interests (1) the personal interest of Mr. McMillan; (2) the interest of the Great Northern Railway, a powerful American Railway company carrying traffic between the Le Roi Mine in Canada and the Northport Smelter in the United States. These two interests appear—at all events as it would seem to the Board—to be jointly and actively working against the true interests of the Le Roi Company; and hence the circular addressed by Mr. McMillan to the shareholders on the 18th September, and his active exertions in obtaining, through the press in Canada and England, approval for himself and opposition to the proposed amalgamation. Recent purchases of large blocks of stock in the names of Mr. McMillan and others tend to confirm this view.

Mr. George S. Waterlow, who spent much time in Canada during the present year, and took great pains in promoting this amalgamation, found himself continually opposed by Mr. McMillan, and he was compelled, in the interest of the shareholders, to differ from Mr. McMillan, with whom he had been for many years amicably associated, and whose advice had been proved to be misleading. And later, when Mr. Aldrige, the eminent mining engineer, who was so prominently referred to at the last general meeting, came to England to confer on behalf of the other companies with the Le Roi Company as to the arrangements it would be possible to effect, it was found that no progress could be made so long as Mr. McMillan remained on the Board. It was thereupon intimated to Mr. McMillan that the other members of the Board were dissatisfied in two respects: (1) his management of the mine, and (2) his opposition to the proposed scheme of amalgamation. On his declining voluntarily to resign his position, the Board had no alternative, but were compelled, in the interests of the company, to exercise the power in this respect given to them by the Articles of Association.

Mr. McMillan claims for himself that he has made a great success in the past year at the mine. It is therefore necessary to state that, having regard to the much improved price of copper, and to the better results to the company from the Tacoma contract, arranged by Mr. Parrish and Mr. Wilson, the receipts of the company were, after all, disappointing; and also that larger profits would have been secured if the recommendation made by Mr. Mackenzie (but opposed by Mr. McMillan) of sending the Le Roi ores to the Trail Smelter, instead of to Northport, had been adopted.

In August, 1904, Messrs. Bradley & Mackenzie resigned their position as consulting engineers to the company, for the following reasons, given in their own words:—"We do not approve of keeping the Northport Smelter in operation under existing conditions, as the ore now mined can be sold in the open market at a rate that will effect a saving of a dollar per ton, equivalent to \$80,000 a year, at the present rate of shipments." In fact, they found that their ideas, as Mr. McMillan himself expressed it, "did not harmonize" with those of Mr. McMillan. Fortunately, as Mr. McMillan has left the Board, Messrs. Bradley and Mackenzie have now consented to resume their position, and the Board are proceeding on the advice of this firm, as regards the proposed amalgamation, having full confidence in them, and knowing that they stand at the head of their profession on the American Continent.

Mr. McMillan has constantly desired to obtain full power, and to have complete control in his own hands. After the unfortunate circumstances of Mr. Parrish's management, this was conceded to him. He reported Mr. Parrish's resignation on the 27th May, 1904, and one of the early uses he made of it was to draw, for four months, Mr. Parrish's salary as general manager, in addition to his own salary as managing director, without communicating with London. This abuse of his position was only discovered in London after the receipt of the accounts from Rossland; and on the 30th November a letter was written to Mr. McMillan containing the following passage:—"The Board were sorry to find you were drawing salary at the rate of \$10,000 per annum without any previous communication with the Board, especially as such action does not carry out the terms expressed in your cable of the 30th August last to the effect that you 'intended to reorganize arrangements with economy,' in consequence of which your proposal to act as general manager, as well as managing director, was agreed to by the Board." This matter was afterwards rectified as regards future payments, by allowing him to draw £1,500 a year, with the title of managing director only, in place of £2,500 a year.

The Board consider it only right to state thus much at once for the information of the shareholders, by way of reply to Mr. McMillan's circular, which might otherwise lead to much misapprehension. They will be prepared to enter at greater length into these and other matters in future. Meanwhile, they will lose no time in issuing a report, and calling a general meeting when they receive from Canada the information of shareholders' meetings having been held in that country of the other companies to be included in the proposed amalgamation; and this report will give full information in regard to these companies, which are not, as stated by Mr. McMillan, of "very doubtful merit," but which, with the Le Roi Company, are calculated to form a powerful combination capable of earning substantial and regular dividends for all the parties interested in them. In fact, the actual resources of the proposed combination will be sufficient to provide the new combined company, so to be formed, with the necessary working capital without coming to the public for subscriptions.

## MINING IN BRITISH COLUMBIA.

(From Our Special Correspondent.)

The principal feature in the mining at the Coast last month was the commencement of extensive development operations at the Britannia mine. The ore is giving trouble in its reduction, as it is highly silicious and a suitable flux of oxide of iron, which it is stated can be procured in the properties of the vicinity, is now being sought for.

In the Boundary camp the principal item of news is perhaps the increase of the Granby smelter to eight furnaces in order to deal with the greatly enlarged output of the Granby mines. In addition from the Boundary comes the news that the Dominion Copper Company is also likely to erect a smelter at Grand Forks. In the camp on the north fork of the Kettle River, where a new railroad is projected, which will probably find its outlet at Vernon, the McKinley, has recently been opened up in a



gratifying manner and has partially demonstrated that the ore on that property, known to be of a large extent, is of a considerably higher grade than was at first estimated.

In the Lardeau there is much work doing this summer on numberless properties and the Triune has succeeded in sending a fair amount of lead ore to the smelter at Nelson. The country, however, is so difficult, the problems of transportation as yet so unsatisfactorily settled, that it will be some time before this section pushes it way into the front rank of shipping districts.

The Slocan is generally much improved as is also the Ainsworth districts. Including the St. Eugene of East Kootenay, in the lead ore sent to the smelters the August returns for Trail and Nelson show that 2,000 tons were produced. This is not including the smelter at the Sullivan mine in East Kootenay, which for some occult reason, refuses to make public its returns month by month. From other evidence, however, the output can be safely set down as not less than 500 for August last. Were this rate kept up during the entire year, and there are indications that it will even be exceeded, the output will exceed 30,000 tons during the coming twelvemonth. This would be a larger output of lead of any since the year 1900, which was high water mark for the Kootenay lead mines. All this shows in an unmistakable manner that there is a larger number of men at work and that there is a decided boom in the mining of these districts. Indeed, it is beginning to be freely prophesied that the boom of earlier days will be repeated with even better results.

One little district of which nothing much has been heard since the days of the Quartz Creek boom in 1897, is the Ymir. Here much work is being done by a number of men, mostly poor, who are doing their best to develop a country to which they have stuck in fair and foul report for a number of years, some, indeed, dating back to the late eighties. The Hunter V., Kootenay Belle, and many another will be heard of as the next year is waning.

From Rossland comes all kinds of rumors as to amalgamations and such like. The most important piece of news in that camp is, however, the re-discovery of the famous Black Bear shoot from which so much good ore was shipped by Bernard Macdonald from the sixth, seventh and eighth levels of the Le Roi, but which seemed to have panned out on the ninth. Also it is interesting to learn that \$15 ore has been found on the 1,550 level, the lowest point of the mine. This shoot, of which dimensions have not as yet been ascertained, is supposed to be a continuation downwards of that found, a blind lead, apparently, on the 1,300.

From East Kootenay comes the report that the St. Eugene is putting an additional twenty drills to work, roughly meaning 100 men. This will enable that mine to largely increase its output. What the Sullivan is doing is largely a matter of conjecture, as the management is more than ordinarily reticent, as already stated. However, the new smelter there has a capacity of at least 8,000 tons of lead annually and it is declared that the furnaces are kept busy. The Heberlein process seems to have been finally adopted, although there is no official word of its being taken over by the directors of the property.

## ONTARIO MINING INTELLIGENCE.

(From Our Own Correspondent.)

The extent of mining operations at Cobalt may be judged by the number of men now employed at the principal mines: Nipissing, 71 men; Timmins, 60; White, Hargreaves & Co., 45; Buffalo Mining Co., 43; Trethewey Mine, 30; Drummond, 35; Victoria, 25; O'Brien, 20; Jacobs (Kerr Lake), 20; Violet, 18; McLeod & Glendinning, 18; Glendinning & Blair, 16; Chambers, Ferland & Co., 15; Hudson Bay and Temiskaming, 14; Watts, 8; while a number of smaller mines employ 2 or 3 each. At the Timmins and Nipissing mines good buildings have been erected. The former has an excellent bunk-house, two stories high, steam-heated, with sitting room, 30x40; reading room, library, 12 bedrooms, with four single beds each. The O'Brien mine is putting up a bunk-house, 75x30, with

reading room, 30x21, on each floor; 16 bedrooms, 14x7 on each floor, for 2 men each, with a window in every room, bath rooms, wash rooms, and other conveniences. A separate building, 50x30, contains a fine dining room and kitchen. The buildings are steam-heated and lighted by electricity. The water supply is obtained from Peterson Lake, and is good; but the well from which most of the Cobalt supply of drinking water is obtained, is contaminated and has been condemned.

Prospecting is going on vigorously at Cobalt, and some new discoveries are reported. The Nipissing Co. has over 20 veins on its properties, one 18 inches wide and one 14 inches. At the Trethewey, one vein has run into Galena. The Nipissing and Timmins are now the largest producers. The Buffalo Mining Co. has traced one seam for 800 feet, but have not yet established its richness. At Geo. Clendinning's claim at Giroux Lake, a vein nearly half a mile long and averaging 8 inches wide, has been located. A 22-lb. nugget of native silver, containing 80 per cent. of metal, has been received at the Bureau of Mines, Toronto, from McLeod & Glendinning's property near Cross Lake.

The B. A. Pyrite Co. is shipping ore steadily from its mine at Queensboro, Ont., to the reduction works at Buffalo. It will soon have two drills at work, and will then be in a position to ship two carloads a day.

The Coleman Cobalt Mining Company has been recently incorporated to carry on mining in the Cobalt district, the directors and officers being Mr. R. M. Copeland, president; Mr. A. R. Moore, vice-president; Mr. H. B. Wills, secretary-treasurer; and Messrs. R. L. McCormack and Robt. Falconer. The Company owns a property of 30 acres near Kerr Lake, where a drift has been run for 45 feet into the hill and a shaft is being sunk, which is now down some 14 feet. The Company also controls a property north of Cobalt, on which no work has yet been done.

Mr. Samuel Price, who was commissioned by the Ontario Government to inquire into disputed claims in the Cobalt district, has reported, and the Minister of Lands and Mines has given his decision in several of the cases, as follows: Charles S. Haines' application for a mining lease on lot 7, con. 6, township of Coleman, refused, on the ground of no valuable discovery having been made; H. D. Graham, Walter Bowen and John McChesney, applicants for a claim on lot 3, con. 5, township of Coleman, McChesney's claim allowed; E. I. Scully applied for a claim on lot 3, con. 6, township of Coleman, but withdrew his application and subsequently asked to have it reinstated. Meantime J. O'Handy had staked out a mining claim. Scully's application to be reinstated refused.

The Ontario Reefs Mining and Development Co. has commenced operations at the copper property known as the Harmony Mine, near Sault Ste. Marie, under the direction of Mr. John Galt, C.E.

The courts are being asked to settle a dispute between Mr. A. M. Hay, of Kenora, as plaintiff, and Messrs. Roy H. Clarke and R. C. Longley, as defendants, the former demanding a specific performance by Clarke of an agreement to sell a cobalt-silver claim in the township of Coleman, and a declaration that an application by Longley for the lot was made as trustee for Clarke, and for an injunction to restrain them from selling to any other party. This is only one of numerous cases cropping up since the wealth of the Cobalt district has been established.

A petition has been sent to the Minister of Lands and Mines for Ontario, from the Rainy River district, asking a delay of a year in cancelling mining leases for default. The Minister has not yet announced his determination, but it is significant that no announcement of leases cancelled has appeared in the Ontario Gazette for the past month.

Mr. D. D. Mann, of Mackenzie & Mann, has been making a personal investigation of the Cobalt mining district.

Much dissatisfaction is expressed with the action of the Ontario Government in suspending the mining regulations, as a new law cannot be passed till the Legislature

meets, and in the meantime there will be a state of unrest and uncertainty. With a view to bringing about a satisfactory revision of the law, mining men are being asked to hold meetings in the respective districts in order to give expression to their views and select delegates to a convention to meet at the Parliament Buildings, Toronto, about the middle of November. At this convention the resolutions adopted at the various local meetings will be considered and a consensus of opinion arrived at which will assist the Government in framing a law. Meetings will probably be held at Kingston, Madoc, Haileybury, Sudbury, Sault Ste. Marie, Port Arthur, Fort Francis and Kenora, and possibly a few other points. The Hon. J. P. Whitney and the Hon. Frank Cochrane have returned from their visit to the Cobalt district, but are reticent regarding the future policy of the Government.

A vein of galena has been discovered near Lake Abitibi, by Mr. H. L. Kerr, who is in charge of an exploring party in that section.

Mr. Eugene Coste is inspecting for Messrs. Mackenzie & Mann, the Marks-Wiley mining claims in the Lion Lake district, containing deposits of hematite.

Mr. T. H. Crowley, a mining prospector of Steelton, Ontario, recently exhibited a number of mineral specimens in Toronto. In conversation with your correspondent he stated that he had for two years prospected in the Rainy River country and had found both hematite and magnetite ore north of Fort Francis. He had also discovered a mineral deposit in which there was 40 per cent. of sulphur and also arsenic, with gold enough to pay the cost of working. The vein is said to be 60 feet wide and traceable for half a mile. At Stone Dam, there is, Mr. Crowley affirms, a deposit of copper and iron with traces of nickel. It probably is part of the Missabi range and is very rich but until railway communication is established, is inaccessible. Mr. Crowley says he has formed a syndicate of twenty persons who are each investing a thousand dollars to develop an iron property at Sea Gull Lake. He claims also to having discovered corundum and dark mica near Bancroft, and a deposit of lithographic stone, at a place not indicated. Samples of the latter looked as if they might be valuable.

### GOLD MINING IN NEWFOUNDLAND.

The Goldenville Mining Co., among whose shareholders are a number of residents of St. John, N.B., has ordered from Messrs. I. Mathewson & Co., Ltd., a complete milling plant for Mings, Nfld. On the property development operations have been in progress for some time past, a shaft having been sunk to a depth of 150 feet, while a number of mill tests have been made of the ore at North Brookfield, Queen's Co., N.S. This is the first mine in Newfoundland, where gold has been found to exist in paying quantities.

### THE INVALIDATION OF CLAIMS IN THE COBALT DISTRICT.

The following claims in the Cobalt district, amounting to eighty-one during the month of September, have been declared invalid by the Inspectors appointed by the Ontario Government:

6th September, 1905.

| S.E. quarter of | South half of | Lot | Concession | Township of |
|-----------------|---------------|-----|------------|-------------|
| N.E.            | South         | 1   | "          | 11 Bucke    |
| N.E.            | North         | 1   | "          | 4 Lorrain   |
| N.E.            | South         | 5   | "          | 4 Coleman   |
| N.E.            | North         | 2   | "          | 5 "         |
| N.W.            | North         | 3   | "          | 5 "         |
| S.E.            | South         | 3   | "          | 5 "         |

9th September, 1905.

| S.W. quarter of | North half of | Lot | Concession |           |
|-----------------|---------------|-----|------------|-----------|
| N.E. pt.        | North         | 4   | "          | 3 Coleman |
| S.E. pt.        | South         | 3   | "          | 4 "       |
| S.E. quarter of | North         | 5   | "          | 4 "       |
| N.W.            | North         | 1   | "          | 4 "       |
| S.E.            | South         | 11  | "          | 1 Bucke   |
| N.W.            | South         | 15  | "          | 1 "       |
| N.E.            | North         | 10  | "          | 2 "       |

13th September, 1905.

| S.E. quarter of | North half of | Lot | Concession |         |
|-----------------|---------------|-----|------------|---------|
| S.W.            | South         | 13  | "          | 2 Bucke |
| N.E.            | North         | 9   | "          | 1 "     |
| S.W.            | South         | 9   | "          | 2 "     |
| S.W.            | North         | 10  | "          | 1 "     |

16th September, 1905.

| N.E. quarter of | North half of | Lot | Concession |            |
|-----------------|---------------|-----|------------|------------|
| S.W.            | North         | 2   | "          | 11 Lorrain |
| N.W.            | North         | 1   | "          | 11 "       |
| S.E.            | South         | 1   | "          | 11 "       |
| S.W.            | South         | 3   | "          | 12 "       |
| N.E.            | North         | 2   | "          | 2 Coleman  |
| N.W.            | North         | 2   | "          | 2 "        |
| S.E.            | North         | 2   | "          | 2 "        |
| S.E.            | North         | 2   | "          | 3 "        |
| N.E.            | North         | 2   | "          | 3 "        |
| S.W.            | South         | 1   | "          | 4 "        |
| S.E.            | South         | 2   | "          | 4 "        |
| S.W.            | South         | 3   | "          | 4 "        |
| N.E.            | North         | 5   | "          | 4 "        |

South parts, South East and South West quarters of South half Lot 1 Concession 6.

20th September, 1905.

| N.E. quarter of | South half of | Lot | Concession |            |
|-----------------|---------------|-----|------------|------------|
| S.W.            | South         | 2   | "          | 4 Coleman  |
| N.E.            | South         | 2   | "          | 4 "        |
| S.E.            | South         | 3   | "          | 10 Lorrain |
| N.E.            | South         | 3   | "          | 10 "       |
| N.E.            | South         | 3   | "          | 11 "       |
| S.E.            | North         | 11  | "          | 1 Bucke    |
| S.W.            | North         | 15  | "          | 1 "        |
| N.E.            | South         | 11  | "          | 1 "        |
| N.E.            | North         | 9   | "          | 2 "        |
| S.W.            | South         | 10  | "          | 2 "        |
| S.E.            | North         | 13  | "          | 2 "        |
| S.W. quarter of | North half of | Lot | Concession |            |
| S.W.            | North         | 14  | "          | 2 Bucke    |
| S.W.            | North         | 15  | "          | 2 "        |

23rd September, 1905.

| S.W. quarter of | North half of | Lot | Concession |            |
|-----------------|---------------|-----|------------|------------|
| S.W.            | South         | 8   | "          | 2 Bucke    |
| N.W.            | North         | 10  | "          | 2 "        |
| S.E.            | South         | 10  | "          | 2 "        |
| S.W.            | South         | 10  | "          | 3 "        |
| N.W.            | South         | 8   | "          | 3 "        |
| S.E.            | North         | 1   | "          | 11 Lorrain |
| S.E.            | North         | 1   | "          | 5 Coleman  |

27th September, 1905.

| S.W. quarter of | South half of | Lot | Concession |            |
|-----------------|---------------|-----|------------|------------|
| S.W.            | South         | 2   | "          | 11 Lorrain |
| N.E.            | North         | 2   | "          | 11 "       |
| N.W.            | North         | 2   | "          | 11 "       |

30th September, 1905.

| S.E. quarter of | North half of | Lot | Concession |            |
|-----------------|---------------|-----|------------|------------|
| N.W.            | North         | 8   | "          | 4 Coleman  |
| S.W.            | North         | 9   | "          | 5 "        |
| N.W.            | North         | 9   | "          | 5 "        |
| S.E.            | South         | 9   | "          | 5 "        |
| N.E.            | South         | 10  | "          | 5 "        |
| N.E.            | North         | 10  | "          | 5 "        |
| N.E.            | South         | 1   | "          | 6 "        |
| N.W.            | South         | 2   | "          | 6 "        |
| N.W.            | South         | 8   | "          | 6 "        |
| N.W.            | North         | 8   | "          | 6 "        |
| N.E.            | North         | 8   | "          | 6 "        |
| S.W.            | North         | 8   | "          | 6 "        |
| S.F.            | North         | 9   | "          | 6 "        |
| S.E.            | South         | 9   | "          | 6 "        |
| N.E.            | South         | 6   | "          | 1 Bucke    |
| N.W.            | North         | 9   | "          | 1 "        |
| N.W.            | North         | 10  | "          | 1 "        |
| S.E.            | North         | 10  | "          | 1 "        |
| N.E.            | North         | 10  | "          | 1 "        |
| S.W.            | North         | 1   | "          | 10 Lorrain |

### COMPANY MEETINGS.

The Star of the East M. & D. Co.—A meeting of this company was held in Peterboro during September, when the following board of directors was appointed:—Messrs. E. J. Cowain, Tweed; J. K. Dale, Franklin, Pa.; John F. Fritz, Buffalo, N.Y.; C. M. Cozad, Oil City, Pa.; Geo. F. Smith, Henry Lohrey, Thos. Hewlett, Pittsburgh, Pa.; and John R. Steele, Oil City, Pa. It was decided to provide funds for the resumption of operations at the mines in Barrie Township. The president, Mr. M. Smith, and the



secretary, Mr. A. O. Kidd, tendered their resignations and subsequently the following officers were elected:—Messrs. J. K. Dale, Franklin, Pa., president; J. F. Smith, Pittsburg, Pa., vice-president; J. W. Boyce, Peterborough, secretary-treasurer; E. J. Cowain, Tweed, manager.

#### The Lake Superior Corporation.

We have received a copy of the first annual report of the Directors of this company—too late, unfortunately, however, for extended notice in this issue. The following financial statement for the year ending June 30th, was submitted at the annual meeting held at Jersey City, N.J., on October 3rd:

|                                                    |                  |
|----------------------------------------------------|------------------|
| Int. on invest secur. ....                         | \$543,455        |
| Miscel. net. int. ....                             | 42,084           |
| <b>Total income</b> .....                          | <b>\$585,539</b> |
| <b>Coup. from 1st mtg. bonds outstanding</b> ..... | <b>452,175</b>   |
| <b>Balance</b> .....                               | <b>\$133,364</b> |
| Gen. exp., taxes, etc. ....                        | 98,562           |
| Surplus .....                                      | \$34,802         |
| Year ended June 30, 1905:                          |                  |

|                               | Produce-  | On hand     |
|-------------------------------|-----------|-------------|
|                               | tion.     | June 30/05. |
| Ore (tons) .....              | 203,569   | *66,726     |
| Steel rails (tons) .....      | 98,822    | 11,262      |
| Pig iron (tons) .....         | 66,235    | 6,618       |
| Ground wood pulp (tons) ..... | 27,817    | 2,347       |
| Lumber sales .....            | \$233,147 | .....       |
| Scrap (tons) .....            | .....     | 4,817       |

A large amount of coal and ore is being stocked for winter use; also wood for pulp mill.

\*Since sold.

The general balance sheet as of June 30, 1905, follows:

|                                                 |                     |
|-------------------------------------------------|---------------------|
| <b>Assets:</b>                                  |                     |
| Invest. loans and secur. of subsid. companies.. | \$51,201,928        |
| Cash .....                                      | 76,095              |
| Collateral securities .....                     | 150,000             |
| Treasury bonds .....                            | 956,879             |
| Furniture and fixtures .....                    | 354                 |
| Due from subsid. companies (advances) .....     | 1,531,543           |
| <b>Total</b> .....                              | <b>\$53,916,799</b> |
| <b>Liabilities:</b>                             |                     |
| Capital stock ..                                | \$40,000,000        |
| Bonds .....                                     | 13,000,000          |
| Bills payable .....                             | 800,000             |
| Canadian Improv. Co. ....                       | 4,677               |
| Coupons unpaid .....                            | 25,900              |
| Due subsidiary companies .....                  | 29,400              |
| Suspense account .....                          | 22,020              |
| Profit and loss surplus .....                   | 34,802              |
| <b>Total</b> .....                              | <b>\$53,916,799</b> |

The directors and officers were re-elected with the exception of Mr. A. P. Boller, who was appointed to the board in succession to Mr. G. P. Terrell.

#### The Eva Mining Company (B.C.)

The annual general meeting of the shareholders of the Eva Mining Company was held in September. The reports of the secretary, president and manager were presented.

The following directors were elected for the ensuing year: Messrs. Dr. E. C. Arthur, W. W. Beer, J. Laing Stocks, W. C. Bayley, A. H. Gracey, G. A. Hunter, and A. L. McCulloch. At a subsequent meeting of the directors, Mr. W. W. Beer was elected president; Dr. Arthur, vice-president; Mr. W. C. Bayley, secretary-treasurer, and Mr. A. H. Gracey, manager.

#### MINING EXHIBIT AT HALIFAX.

The Mining Exhibit at the Nova Scotia Provincial Exhibition, which was held on Sept. 14th, and following days, appears to have attracted a great deal of attention, while the display itself was of an exceedingly representative character. One of the chief features was the display of

specimens of coal and minerals shown by the Government. The following companies were represented:—Inverness Railway and Coal Company, Broad Cove; the Port Hood Coal Co., Port Hood; the Cape Breton Coal Mining Co., New Campbellton, C.B.; the Gowrie and Blockhouse Collieries, Port Morien, C.B.; Sydney Coal Co.'s Collieries, Indian Cove, C.B.; Strathcona Coal Co., River Hebert, Cumberland; Intercolonial Coal Co., Drummond Collieries, Westville; the Nova Scotia Coal Collieries, Maccan; the Maritime Coal Co., Chignecto; Colchester Coal and Railway Co., Debert Field.

Among the minerals shown were specimens of gypsum, graphite, malachite, native copper, hematite and magnetite, while fine specimens of gold, quartz, etc., were shown by the West Lake Gold Mining Co., Uniacke Mine; Crease's Mine, Uniacke, King's Mine, Brookfield, Gold River, Golden Group Co., Montague, Renfrew, South Uniacke and other mines.

Both the Dominion Iron & Steel Co. and the Nova Scotia Steel and Coal Co. had interesting exhibits, the former exhibit steel rods manufactured in the Province.

#### NOVA SCOTIA MINERAL AND COAL PRODUCTION.

(From Our Special Correspondent.)

The following figures will probably be of interest to our readers:—

|                                                        |                |
|--------------------------------------------------------|----------------|
| Coal Production, Jan. 1/05 to June 30/05 ..            | 2,305,209 tons |
| Coal production for corresponding months of 1904 ..... | 2,009,483 tons |
|                                                        | Tons.          |
|                                                        | furnished.     |
|                                                        | yield.         |
|                                                        | Oz. Dwt.Gr.    |

|                                                        |        |       |    |   |
|--------------------------------------------------------|--------|-------|----|---|
| Gold production Jan. 1/05 to June 30/05. ....          | 16,778 | 4,467 | 0  | 3 |
| Gold production for corresponding months of 1904 ..... | 22,099 | 5,963 | 17 | 2 |

From the present outlook it would seem that the production of coal during the next fiscal year would compare favorably with that of the past, and that indications point to an increase in the gold yield.

Very little has been done in gold mining during the month of September, and no returns have yet been made. Gold mining areas taken in the different districts during the month are as follows:—

|                                   |    |       |
|-----------------------------------|----|-------|
| Gold River District .....         | 11 | areas |
| Stormont District .....           | 62 | "     |
| Montague District .....           | 13 | "     |
| Harrigan Cove District .....      | 22 | "     |
| Little Beaver Lake District ..... | 24 | "     |
| Leipsigate District .....         | 74 | "     |
| Oldham District .....             | 8  | "     |
| Miller's Lake .....               | 16 | "     |
| Mill's Village .....              | 8  | "     |
| 15 Mile Stream .....              | 36 | "     |
| Gay's River .....                 | 6  | "     |
| McKay Settlement .....            | 23 | "     |
| West New Annan .....              | 26 | "     |
| Kemptville .....                  | 21 | "     |
| Brookfield .....                  | 22 | "     |
| Caribou .....                     | 16 | "     |
| Quoddy .....                      | 30 | "     |

Total .....

#### MINING MEN AND AFFAIRS.

Mr. G. G. S. Lindsey, general manager of the Crow's Nest Pass Coal Company, has returned to Canada from a visit to England.

Mr. J. H. Mackenzie, the well-known mining engineer, of San Francisco, has again assumed the management of the Le Roi mine at Rossland.

Mr. E. B. Kirby, who is now engaged in consulting practice is at present located at Reno, Nevada, a section which promises to afford great results.

Mr. S. S. Fowler, of Nelson, B. C., was recently retained to visit and report on the old Sultana mine, Kenora, Ontario, for an English syndicate, which has secured control of the property.

Mr. L. Muller, who has acted as foreman of the Slough Creek Company, Cariboo, B.C., for the past twelve years or so, has been appointed mine manager of the Willow Creek Mining Company.

Mr. John Hopp, whose connection with deep level mining in Cariboo, is so well known, has been appointed agent in British Columbia for the Slough Creek Gravel Gold, Limited, which has taken over the affairs of the Slough Creek Company.

Mr. W. J. Watson, who, for the past two years has acted as assistant superintendent of the Tyee Copper Company's smelter at Ladysmith, B.C., has been appointed superintendent, in the place of Mr. T. Kiddie, whose resignation has been accepted.

Col. Pellatt, one of the directors of the Dominion Iron & Steel Company, states that the company's earnings for July and August were very satisfactory, particularly those of the latter month. Both the rail and the rod mill are now proving profitable undertakings.

It is satisfactory to learn that Dr. Eugene Haanel's report on electric smelting has created a very great interest in metallurgical circles not only on this continent, but in Europe also. Of the large edition published very few copies of the work remain on hand, three thousand having been sold.

Dr. P. L. F. Heroult, technical director of the French Electro Metallurgical Society, visited Ottawa during the month in order to confer with Dr. Haanel in regard to the electric smelting experiments to be shortly carried out at Sault Ste. Marie, for which purpose the Government has appropriated \$15,000.

Prof. R. H. Richards, professor of mining in the Massachusetts Institute of Technology, in Boston, is visiting the Pacific Coast in connection with an examination of the black sands of British Columbia, at the request of the Dominion Government, made through the United States Geological Survey Department.

A public meeting was held at Sydney, N.S., on Sept. 28th, at which some four hundred people were present, to discuss the amalgamation of the Dalhousie and King's College evening classes. The meeting was addressed by Professors Murray and Carruthers, of Dalhousie; Prof. Hannah, of King's College, and others.

The Ashcroft Journal states that Mr. J. B. Hobson, manager of the Cariboo Hydraulic, has proceeded to New York to discuss the negotiations with capitalists there, who are acquiring a considerable interest in the property. The gold yield of the past season from the mine, as a result of fourteen days' washing only, was \$21,000.

Mr. H. P. Dickinson, general agent of the Giant Powder Co., reports great activity in the Boundary Creek district, British Columbia, in view of the building of the V. V. & E. R'y. and the Midway & Vernon R'y. On the former some six hundred men are now engaged in construction work. Mining in the district is in a very prosperous condition.

Mr. Jno. E. Hardman, the well known consulting mining engineer, who for the past ten years has occupied offices in the Windsor Hotel, Montreal, has, this month, removed to Room 10, 171 St. James Street. These latter offices are very centrally located in the business section of the city, and consequently Mr. Hardman's clients should have no difficulty in finding him.

A very representative exhibition of British Columbia minerals was shown at the recent Dominion fair held at New Westminster, B.C. This collection was in charge of the Assistant Provincial Metallurgist, Mr. H. Carmichael. In addition to the specimens contributed by the Provincial Museum a fine collection of minerals from Barkerville was shown, as well as an exhibit of gold from Atlin.

In reporting the departure of Mr. Norman Carmichael, who has been appointed to fill an important position with the Arizona Copper Company at Morenci, the Nelson Daily News remarks that Nelson loses a good citizen, and the local mining district one of the most competent engineers that have been identified with this development. Mr. Carmichael came to Nelson in 1895, and has been connected with the Hall mines, Fern, Molly Gibson, Duncan, Granite and Highland mines.

The Victoria Colonist, in a recent issue makes the following very pertinent enquiry, a really straightforward reply to which should prove of considerable interest:—

"The Globe, in its editorial notes and comments, remarks that 'the mining interests of Cobalt should be willing to regard a royalty on the output of rich mines in the same light as a rake-off for the house on each 'jack-pot.' That is a very practical way to look at the subject of royalties, but the question that arises is, how comes the reverend editor of the Globe to have such a familiarity with the expressions of the gaming room and the methods there employed?"

Mr. Frank H. Sherman, labour candidate from Frank for legislative honours in the new Province of Alberta, has issued an address to the electors of the Pincher Riding, outlining his views. Some of the planks of his platform are of an extremely radical character, including public ownership of all public utilities, while he also advocates an eight-hour law for miners and a workmen's compensation act. Referring to the coal mining legislation, Mr. Sherman, who is, by the way, president of the local union, expresses the opinion that the present laws for the regulation of coal mines in the province are capable of many improvements, and measures should be passed having that end in view.

The Daily Whig, of Kingston, in a leading article, entitled "Canada for Canadians," quotes the following paragraph from the Muskegon (Michigan) Chronicle: "Reginald R. Hemp, of Muskegon, has been appointed on the assay and mineralogical corps in the Cobalt and Nickel Nipissing mining district, Ontario. A request for five men was sent to the Michigan Mining School at Houghton, in which he is a student. He was one of the five to be selected. His appointment is for one year, after which he expects to return to Houghton for another year to complete his course." Commenting thereon, the Whig rather indignantly asks why the Ontario Government did not appoint for this office competent students from the Kingston School of Mines.

Referring to the mining developments up the West Fork of, Kettle River, the Boundary Creek Times thus rather trenchantly, criticizes the work that is being done at the Carmi by an English syndicate:—"The work so far done on the Carmi has not been what might be termed economical or practical-mining. A large sum of money has been expended in equipment for the development done. However, the machinery is on the ground and in good condition. The state of the machinery may be accounted for by the fact that an order comes to the mine occasionally to have it "unwatered." Then steam is got up and the pumps worked night and day until the mine is clear. A few days after a cable will be received: 'Close the blasted mine until the tennis season is over!'"

Not unnaturally, the recent arrangement by which the Le Roi ore is to be shipped to the Trail smelter, causes considerable annoyance to the Northport Republican. The local newspaper published in the little town of that name. This organ of Northport public opinion takes up the cudgels for Mr. McMillan, but in the course of its argument makes some statements that are, to put it mildly, contrary to fact. Thus, it is stated that Mr. E. S. Waterlow (sic) was appointed a director of the Le Roi Company, by Mr. McMillan, while Mr. F. W. Rolt, recently elected to the board, is described as a director of several mining fiascos in British Columbia; but we do not suppose that either Mr. Waterlow or Mr. Rolt will think it worth while to commence an action for libel against the Northport Republican.



At the annual meeting of the Lake Superior Corporation, Mr. T. J. Drummond was re-elected vice-president of the company.

Dr. Ledoux, of the well known New York metallurgical firm, visited Cobalt, Ontario, during the past month. Already nearly 100 carloads of ore have been received at the Ledoux & Company's works, from this section. Dr. Ledoux, however, is reported to have stated that practically the whole production of the Cobalt camp is at the present moment being stored in New York, awaiting treatment.

On the departure of Mr. Thos. Kiddie, who for the past several years has done excellent work as manager of the Tyee Copper Company's smelter at Ladysmith, he was tendered a banquet by the citizens of that town, and also presented with an address and a handsome gold watch, on which the following inscription was engraved:

"Presented by the employees of the Tyee Smelter to Thomas Kiddie, Esq., on the occasion of his retiring from the service of the company. Ladysmith, B.C., Sept. 15, '05."

It is interesting to note the difference between the steel rail exports from the United States into Canada for the first eight months of 1904, which amounted to 93,256 tons, as compared with 4,680 tons consigned to this country during the corresponding period of this year. In this connection the Wall Street Journal remarks that the "American steel rail pool are receiving an object lesson in the practical working of the protective duty when the shoe is on the wrong foot. They were unable to bid for any part of the order for 150,000 tons of steel rails just given by the Grand Trunk Pacific to the Dominion Iron and Steel Company, because of the new Canadian duty of \$7 a ton levied on all steel rails bought in the United States."

### MINING STATISTICS.

The coal shipments from Nova Scotia, last month, were as follows:—

|                                       |               |
|---------------------------------------|---------------|
| Dominion Coal Company.. . . .         | 307,084 tons. |
| Cumberland Railway & Coal Co.. . . .  | 39,208 "      |
| Acadia Coal Company.. . . .           | 21,710 "      |
| Nova Scotia Steel & Coal Co.. . . . . | 61,723 "      |
| Inverness Railway & Coal Co.. . . . . | 9,867 "       |

The following is a detailed statement of importations of copper and copper ore from British North America, as per official returns of the United States Bureau of Statistics (ore in tons of 2,240 pounds—copper in pounds):—

| Month of August—            | Ore.   | Copper.    |
|-----------------------------|--------|------------|
| From Canada .. . . .        | 51,284 |            |
| Nova Scotia .. . . .        |        | 10,715     |
| British Columbia.. . . .    | 10,634 | 1,573,665  |
| Total for August.. . . .    | 10,634 | 1,635,664  |
| Previously reported.. . . . | 77,200 | 13,322,445 |

Total for 8 months... . . . . 87,834 14,958,109

Smelter returns for August from the Nelson and Trail smelters show production of 2,072 tons of lead. The Marysville smelter will not publish its figures, but the output is estimated at 500 tons at least. This rate shows a production of 30,000 tons of lead for the year, which was only beaten in 1900 with 31,000 tons. The production in 1905 was 18,000 tons; 1903, 9,000 tons; 1902, 11,000 tons. A great revival is thus shown.

The production of the Rossland mines for the nine months ending September 30th, aggregates 252,063 tons.

Boundary district ore shipments for the nine months of the present year total 652,651 tons.

The gold output in Nova Scotia in 1903 was 27,779 ounces from 103,856 tons of quartz crushed. Last year the output was only 11,273 ounces, from 45,436 tons of quartz. This is a reduction of 16,496 ounces, a falling off of considerably more than a half, and it is understood that for the current year the decrease is still more pronounced.

### COMPANY NOTES.

A meeting of the directors of the Canadian Northwest Oil Co. was held at the 88 Government Street, Victoria, on Sept. 11th, when arrangements for the early commencement of work at the company's property were made.

**Tyee Copper Company (V. I.).**—During the month of August the smelter was in operation for twelve days, treating 2,018 tons of ore from the Tyee mine, from which a return was obtained after the deduction of freight and refining charges of \$39,110.

**Le Roi No. 2 (Rossland).**—The report of the manager of the London office, for August, was as follows:—"Shipped, 780 tons; the net receipts are \$2,563, being payment for 191 tons shipped, and \$2,098 being payment for 63 tons concentrates shipped; in all, \$4,661; in addition to above, received \$4,125 for 350 tons ore on dump; the total receipts for the month are \$8,787."

**Le Roi.**—The manager reports as follows:—"Shipped from the mine to Northport during the past month 9,158 tons of ore, containing 3,697 ozs. of gold, 3,600 ozs. of silver, and 211,250 lbs. of copper. Estimated profit on this ore, after deducting cost of mining, smelting, realisation and depreciation, 25,000 dols. Expenditure on development work during the month, \$8,500. Shipped from the concentrator to Northport 71 tons of concentrates, of an estimated value of \$960. Have found extension of Black Bear ore-shoot, 900-foot level; promises large tonnage. Have found the ore at 1,550 feet level. Average value, \$14. Extent at present unknown."

**Giant Mining Company, Limited, London, E.C.**—Lien registered August 12th, for £1,000 six per cent. debentures, part of £9,000; amount previously issued, £8,000; no trustees; charged on the undertaking and all the property, present and future, including the uncalled capital for the time being.

**Granby Company.**—A Boston report states that in January next a dividend of five per cent. will be paid by this company. The net profits are stated to be at the present price of copper, \$2.00 per ton, while it is also said that for some months past the ore shipped has shown higher gold values.

**Arlington (Erie) B.C.**—The manager sends in the following information:—"During the month of August 130.7 tons of ore were shipped to the Hall mines smelter, the net returns on which amounted to \$6,120.42. The expenses, including development, were \$4,488.23. The directors of the Hastings (B.C.) Exploration Syndicate, Ltd., have granted a bonus of one month's salary to the company's officials in B. C. and to the miners and other men working at the Arlington mine a bonus of two and one-half shifts.

**Slough Creek Co.**—The following circular has been issued from the office of the Slough Creek Gravel Gold Company by the secretary: "Mr. J. D. Kendall, the consulting engineer, who, as you are aware, has again visited the property, writing on August 18th, states: I am glad to inform the directors that I consider the pumping capacity is fully able to cope with the overflow of water—the surface level of which has fallen over three feet during the last seven days—and I am certain that the water difficulty is now quite overcome. Owing to the still considerable outflow, I have been unable to take large samples, as I had intended, for testing purposes, but I have obtained sufficient to fully confirm my previous estimate (a minimum net profit of 10s. per cubic yard). Development work is proceeding rapidly, and a new drive has been started near the end of No. 2 upraise, which will have the effect of more speedily draining off the water. Machinery of every kind is in perfect order, and equal to any demands that may be made on it, and the position at the mines is most satisfactory."

### COAL MINING NOTES.

#### NOVA SCOTIA.

A strike was declared at the Springhill colliery during the month, but, fortunately, was of short duration, the matters of difference between the Company and the men being amicably arranged.



It is reported that the Dominion Coal Co. has in contemplation the construction of an electric plant near its No. 2 colliery, which will be used as a central power station for all the mines operated by the company in the vicinity of North Sydney, C.B. Should the project be carried out, the pumping at all the operations will be performed by electricity, and the fans will also be electrically operated.

Thus says the Eastern Chronicle, "We learn that at the Allan Shafts during the month of August there was some phenomenal work done. One of the shafts was sunk in the month a depth of 128 feet, and 100 feet of the distance was timbered. This will constitute almost a world's record. Recently a shaft was put down 107 feet in a month in a coal mining town in Pennsylvania and the fact was heralded everywhere. The workers at Lourdes have this beaten by 28 feet. Mr. W. H. Hyde was in charge of the work at Allan Shaft.

#### ONTARIO.

Bituminous coal is reported to have been discovered near Ennismore Township.

#### ALBERTA.

The strike of the coal miners at Frank, which continued for three weeks, was brought to a termination on the 30th of September, when the company arranged terms which have been accepted by the miners.

The Canadian Metal Company has leased from the Canadian-American Coal and Coke Company, the coal seam at the north of the C.P.R. tracks, known as the north tunnel. The vein debouches almost immediately into the smelter, which renders the obtaining of a coal supply an exceedingly simple and economical matter. The deal is of great importance to the metal company as by operating its own colliery, mines and smelter it will be able to conduct its business at a minimum cost.

At the mines of the International Coal & Coke Co., at Coleman, an output of some nine hundred tons of coal per day is being maintained. The company are giving employment to about three hundred men, a large part of whom are engaged in pushing development work. The No. 2 entry has reached a depth of 4,000 feet while the No. 4 is in over 2,700 feet while the slope being sunk has reached a depth on the coal of over seven hundred feet.

#### BRITISH COLUMBIA.

It is a matter of congratulation that the strike which has been in progress for the last four months at Nanaimo has been declared off, the Western Fuel Company having reached an agreement with its employees covering a period of two years.

It is reported that Mr. James Dunsmuir has purchased 2,800 acres of coal lands, near the mouth of the Coldwater River, in the Nicola district, and that development operations are shortly to be commenced under the direction of Mr. W. J. Sutton.

### MINING NOTES.

#### NOVA SCOTIA.

It is reported that a valuable discovery of mica has been made in the vicinity of West Bay. Development work is now in progress.

Referring to the financial position of the Dominion Steel Company, a correspondent writes:—

"The earnings for the first four months of the year amounted to about \$315,000, which, after providing for all fixed charges, including sinking and redemption funds, left a surplus of nearly \$25,000. Since then the rail mill has been started up, and its earnings will consequently be clear profit to the company.

"As the sinking and redemption funds will amount this year to \$200,000, and next year to \$290,000, it would be quite reasonable to expect that some reorganization scheme will be arranged next year, following the example set by the Dominion Coal Company, which will provide for the redemption of the existing issues of bonds, so as to

obviate the large annual payments for sinking and redemption funds, and leave a large amount available for dividends.

"The large demand for steel rails, structural steel, steel rods, etc., which is assured for years to come owing to the building of the Grand Trunk Pacific, the extension of the Canadian Northern, the double tracking and new branches of the Canadian Pacific Railway and the various other railroad enterprises in Canada, ensures a large and increasing market for the output of the company.

"It would seem, therefore, that the premier securities of the company, the first and second mortgage bond issues, are now on a stable footing, and should command the attention of both the investing and speculative public.

"The first mortgage 5 per cent. bonds, due in 1929, of which there are \$7,876,000 issued, have behind them the following securities, the market value of which is as follows:—

|                                              |             |
|----------------------------------------------|-------------|
| \$2,400,000 second mortgage bonds at \$2.... | \$1,968,000 |
| \$5,000,000 preferred stock at 72.....       | 3,600,000   |
| \$20,000,000 common stock at 21 1-2.....     | 4,300,000   |

Total .....\$9,868,000

"The second mortgage 6 per cent. bonds, which are payable in ten annual instalments, have behind them the preferred and common stock, the present market value of which is \$7,900,000, or nearly four times the value of the issue.

"Under these circumstances the first mortgage bonds now selling at 85, which yield 5.88 per cent. on the investment, and the second mortgage bonds, now selling at 82, which yield about 11 per cent., certainly look attractive."

The prospects of the Dominion Coal Company and the Dominion Iron & Steel Company appear, at the present time, to be exceptionally good. The Dominion Coal Co., however, has paid no dividends on its common stock since January, 1904, but the dividends on the preferred have been paid regularly. It is generally believed that the refunding plan of the Dominion Coal Co. means the resumption of dividends on the common stock in the near future. The balance applicable for dividends on the common stock at the end of the last year was \$890,338, or not quite six per cent. on the \$15,000,000 common stock. The fixed charges for that period were over \$730,000. By the refunding plan, this amount has been reduced to \$460,000, a saving of \$270,000 per year and which on the net earnings of last year would have shown eight per cent. on the common stock.

A despatch from St. John's, Nfld., states that the directors of the Nova Scotia Steel & Coal Company propose to commence immediately operations to develop the recently acquired submarine ore deposits at Bell Island. The company has just purchased these extensive areas on the north side of Bell Island, as the ore beds on the island were beginning to run short. The company had six million tons and was excavating at the rate of half a million tons a year, so the life of the terranean areas was but twelve years. The engineers of the company estimate these submarine areas to contain three or four times as much ore as has been found on the whole of Bell Island, or 150,000,000 tons in all. It is certain that the ore extends under the waters of the bay, and the fact is that ore is now being mined by the Nova Scotia Company below the sea level. The company's engineers have been carefully looking into the question and they are convinced that the ore will be found to continue in the submarine areas. The work, so far carried on, has proved that the estimate originally made by Mr. R. E. Chambers, M.E., as to the quantity of ore is practically correct. The Scotia Company has, in its land areas at Wabana, more ore unworked than the new blast furnace at Sydney Mines can use in thirty years, although the capacity of the furnace is more than double that of the Ferrona furnace. As regards the cost of operating these submarine areas the engineers estimate that ore in these marine areas can be got out as a cost of only a few cents per ton more than the present ore from the underground areas on the island. The company now has a very extensive plant, including a shipping pier, tramway,



etc., already established on the island, and is in a position to mine this ore without the large initial cost which would have to be incurred by a new company undertaking the work.

During the month a party, including Messrs. Thos. J. Drummond, president, and Geo. E. Drummond, of Montreal; John L. Drummond, of Midland; Edgar McDougall, vice-president, Montreal; W. M. McLeod, London, England, and C. W. Brega, Chicago, director of the Londonderry Iron and Mining Co., and Geo. Beatty, general superintendent, and W. F. C. Parsons, superintendent of mines for the company at Londonderry, visited the Torbrook-Nictaux iron district, to inspect the mines purchased from the Torbrook Iron Company, and the properties held by Mr. Geo. E. Corbitt on the farms of F. Wheelock, M. Hoffman and Arch. Banks, which the I. L. & M. Co. has been developing. It is understood, that as a result of their visit more extensive operations will be carried on.

A Halifax despatch says the Nova Scotia Steel Company has sold the abandoned works at Ferrona, and the mine there for \$200,000, making a better sale than had been expected.

#### ONTARIO.

During the month the Craig mine produced a gold brick valued at \$2,200, as a result of eleven days' crushing.

The mica property in Burgess is about to be extensively worked by the lessees. The mine was abandoned some four years ago.

In the Manitou section the Big Master mill is now being operated with double shift, while at Dryden the Redeemer Mining Company, an American corporation, is installing a cyanide plant in conjunction with the mill.

Prof. Miller, provincial geologist, reports an important discovery of Bessemer iron ore at Loon Lake, east of Port Arthur. It is said the deposits are much more extensive than first supposed, and that the quality is of a high grade.

The Lake Orion Oil & Gas Co. is reported to have struck a big gusher, which is flowing at the rate of over 600 barrels per day, on their property, at a depth of 1,078 feet, and the company has now drilled ten wells, all of which, with one exception, have been largely productive.

Three enormous ingots of silver have been recently discovered on the Timmins property, Cobalt. The first of these was discovered last year, and realized over \$1,000, while two others have been found during the past month, weighing respectively 160 and 260 lbs. The latter will probably be placed in the museum of the Geological Survey of Ottawa.

The Lake Erie Gas & Oil Company have leased 30,000 acres of land in the first and second concessions of Yarmouth, Malahide and Bayham, between Port Stanley and Port Burwell, in Elgin County, have contracted with local Leamington men for the sinking of three wells until Medina sand shall have been struck, the limit being 3,000 feet.

A correspondent writes from Cobalt:—"There have been no new strikes of any importance recently, so far as I have yet learnt, except the Glendenning discovery on J. B. 8 north of Giroux Lake, where I understand they have done one of the largest outcrops of silver-bearing calcite so far discovered in the camp. It is claimed to be very rich in silver, carrying very little cobalt, nickel or arsenic. In this respect it is very similar to the vein on the Lawson property, which it adjoins."

#### ALBERTA.

Arrangements are being made for the erection of large cement works at Calgary. This undertaking has been initiated by the principal shareholders in the Vancouver-Portland Cement Works, which has established works at Tod Inlet in Vancouver Island.

What is described as the biggest strike of oil ever made in Canada is reported to have occurred on the property of the Rocky Mountain Development Company, where a gusher was struck at a depth of 1,400 feet, the flow from which has yielded 8,000 barrels daily. The oil

lands are situated about thirty-five miles southwest of Pincher Creek and about five miles from the International boundary.

#### BRITISH COLUMBIA.

**Atlin.**—According to a report in the Atlin Claim the most valuable clean-up ever made on a claim owned by an individual in this district was made recently on the Ruffner property at Pine Creek, when gold to the value of \$60,000.00 was recovered, this being the third clean-up on the claim this season.

The gold commissioner has cancelled a number of leases in the O'Donnell Valley, and a large area will consequently be thrown open for re-location by prospectors and others.

**Coast.**—The San Juan Mining and Mfg. Co. has been organized in Victoria to operate a group of claims in the San Juan district and the West coast of the Island. These properties include, according to prospectus issued.

It is stated that shipments of five per cent. copper ore are being made at the rate of four tons daily from the Britannia mine to the wharf, for shipment to the Crofton smelter, ore of a lesser grade than this being sent to the concentrators. It is, meanwhile, reported that arrangements are in progress to drive a tunnel a distance of 1,900 feet into the mountain between the Britannia Copper Syndicate's workings and the Empress group of claims, which were recently acquired by Mr. S. S. Raymond, of the North Penny Mining Company of Wyoming, by which, it is expected, the Britannia lead on the Edith fraction, and the Fairview claims, while also the ore body on the Barbara fraction and Empress claims, will be opened up.

The Cuba Silver Mining Co., on Loughboro Inlet, contemplate commencing shipments to the Crofton smelter this month. The property, however, is still in the prospect stage of development, though promising well.

Operations have been commenced by the bondholders on the Copper Queen property, Texada Island, while the Cornell has been leased to the Cordellero Mines Co., of Seattle, and the property is being unwatered.

Mr. F. W. McCrady, the engineer in charge of the Cutba properties on Loughborough Inlet, in a recent interview stated that in his opinion the output from the Coast mines this year would show an increase of 100 per cent. He further stated that: "Five years ago the cost of smelting coast ores was \$8 per ton, and the price paid miners for copper was 6 cents per pound less than the New York quotation of the day of sampling. Now we get our copper ores smelted for \$2.50 a ton, and the price paid to mines by smelters is 3 cents per pound less than the New York quotation of the day of sampling. Formerly the price paid was on casting copper, while now it is based on electrolytic copper, which is from a half to a cent a pound higher than casting copper. This advantage to the mines can be put in a few words by saying that a five per cent. ore five years ago would not net the mine enough to pay smelting and freight charges, whereas to-day a five per cent. mine would have \$10 left over and above freight and treatment. In the districts of British Columbia last year the Coast stood third in the amount of copper produced, while the average assay was highest."

**Cariboo.**—The Transvaal group of copper claims, situated 18 miles southeast of Ashcroft, were recently bonded to Mr. Jno. M. Turnbull, of the Trail smelter, representing Canadian capital. The property was bonded last year to Messrs. J. D. Sword and Smith Curtis. The price is said to be in this case \$100,000.00, and the properties are believed to be most promising.

The Lightning Creek Gold, Gravel and Drainage Company has struck the old channel of Lightning Creek on its Wing Dam property at a depth of 165 feet. Prospects were obtained from bed-rock, and were found to contain good values.

Indications of petroleum, discovered by Mr. R. T. Ward, in the Beaver Valley in this district last year, have been recently investigated by a Mr. Jas. Hardie, described as an oil expert, who states that the prospects are exceptionally promising.



**Lardeau.**—A steam drill and compressor plant are being installed on the Silver Dollar property at Camborne, while the erection of a mill is also contemplated at the Beatrice, in the same locality. At this latter property extensive development operations are to be carried on during the winter months.

Mr. John Keen, of Kaslo, referring to conditions in Poplar Creek section, remarks that prospectors in the locality having failed to secure outside support, are proceeding with a considerable degree of success to develop their own claims, being assisted by local capital, supplied in part by the railway and steamship officials, who, like the prospectors, have unlimited faith in the camp.

The force of miners at the Silver Cup mine has been increased, and the property is said to be now looking better than at any time in its history.

**Slocan.**—The Monitor Company's new concentrator and zinc separating works at Roseberry are now nearing completion and operations, it is thought, will be started in the next few weeks.

The vein of the Last Chance, where recently developed at 1,250 feet from the portal of the adit, has changed in character to a dry ore, running from 3 to 30 per cent. lead and from 100 to 400 ozs. in silver, several carloads of this ore being shipped to the Hall Mine smelter.

The manager of the Payne has been notified as follows in regard to the duty on zinc sent from British Columbia into the United States: I have to advise you that unless otherwise instructed Collectors of Customs will continue to classify zinc ores bearing lead, without regard to percentage of lead, as lead ores under paragraph 181 of the existing tariff act. However, duty at the rate of 1 1-2 per cent. will be collected on the lead contents only.

During the month an air compressor has been installed at the Ottawa, while active development work has been in progress at the mine.

Mr. C. Fernau has commenced an action against the Monitor Ajax fraction for breach of contract in connection with the building of the Roseberry zinc plant.

**Nelson.**—Foundationless reports of rich strikes at the Ymir mine have been made from time to time during the last few years. Another rumor of the same character, though possibly having more substance, has now been received, to the effect that new ground has been opened up in the lower levels of the mine. The manager, Mr. Hand, reports that the ore is high grade and that he has every reason to believe the discovery to be an important one.

A local company has been promoted to work the Ark group of claims near Hall Siding, on the Nelson & Fort Sheppard Railway. The group comprises eight claims, two of which have been found granted on Sixteen Mile and Clear Water Creeks. The ore is iron pyrites, carrying values in gold. The company purposes carrying on development work throughout the winter months and erecting a five-stamp mill next spring.

Mr. P. Clark has recently bonded the Devlin group on Sheep Creek, a free milling property, for the sum of \$75,000.

Some interest is excited over recent discoveries on the La France claim, situated east of Crawford Bay. At a depth of 150 feet another vein has been encountered which carries values in gold and silver of \$50.00.

**Rossland.**—Some important installations of machinery have recently been made at the Le Roi No. 2. These include a hoist, ordered from San Francisco, and a 150 h.p. electric motor, ordered from Peterborough, Ontario.

At the Le Roi mine preparations are being made for continuing the main five-compartment shaft below the 1,350 ft. level. This announcement is supposed to indicate that the explorations between this and the 1,550 ft. level, which have been in progress for nearly a year have opened up ore deposits to a sufficient extent to justify this development. Meanwhile the Le Roi is now shipping regularly to the Trail smelter.

Another gold-copper furnace will be added to the present equipment at the Trail smelter. There are already four copper furnaces with a combined capacity of about

1,000 tons a day. The smelter is now receiving about 4,000 tons a week from the mines of Rossland, and from 100 to 200 tons a week from Larson, Idaho. The Le Roi will send a little over 2,000 tons a week at the start, and this, with the ore from the other mines will make just about sufficient for the present capacity of the copper furnaces, without the use of the one to be installed. The new furnace will reduce about 250 tons a day, or 1,750 tons a week, which will give a total capacity of 8,750 tons a week for the five furnaces. This will be ample and will allow for contingencies such as breaking down of furnaces or the necessary stops for repairs.

**Boundary District.**—The Phoenix Pioneer is authority for the statement that something over two miles of diamond drilling exploration work has been performed by the Granby Company on its properties in this district during the last few years. The greater proportion of this work of the drilling has been done since 1904. Two machines are in operation, and worked with double shifts, the drills being operated by compressed air.

It is stated that the British Columbia Copper Company has finally decided not to move its smelter from Greenwood to Midway, or elsewhere, but to extensively enlarge and probably in some respects remodel the present reduction works.

Mr. Samuel Newhouse has returned to Salt Lake City after a visit of inspection to the Dominion Copper Company's properties in this district. Mr. Newhouse, in an interview, stated that he was well satisfied with the mining prospects. The companies propose taking active steps towards developing the mines with a view to making heavy shipments in the near future, while also large additions will be made for the present facilities.

Work was recently resumed on two important properties in this district, which have not been operated for some little time. Of these the Elkhorn adjoins the Providence and the Jewel in Long Lake Camp, is owned by the Jewel Gold Mines, Ltd. The Jewel was recently examined by engineers on behalf of the Le Roi No. 2 Co., of Rossland.

Since the commencement of construction on the Midway & Vernon R'y. considerable interest has been taken in mineral occurrences on the main Kettle River, and during the month the Lottie F. group, not far from Canyon City, was bonded for \$60,000. The ore carries, it is said, good values in gold and copper.

Mr. W. Yolen Williams is directing development operations of the Lakeview and Dividend group of claims, recently acquired under bond by the Granby, near Osoyoos.

It is reported on good authority that the net earnings of the Granby Company, for the year ending June 30th, aggregate \$700,000, as compared with last year's profits of \$283,000.

Considerable inconvenience has been occasioned by the lack of power in this district, the Granby Company, on this account, being obliged to reduce the smelting capacity of their works to six furnaces. Power has previously been supplied by the Cascade Power Company, but the increased activity in the district has overtaxed this company's capacities and additional power will shortly be transmitted from Bonnington Falls by the West Kootenay Power & Light Company.

**Similkameen.**—At Hedley City the Nickle Plate Mine is being extensively operated, from 100 to 125 tons of ore being crushed daily. The values saved on the plates vary from \$4.00 to \$10.00. The ore is now being quarried largely from the surface.

**East Kootenay.**—The output of the St. Eugene mine for August amounted to 3,200 tons of ore and concentrates. Three new boilers were recently installed at the mine.

Already the enlargement of the Sullivan smelter is mooted. The mine has been in operation since the 1st of July last, and a very considerable tonnage of ore has been extracted.



## YUKON.

Very promising quartz developments seem to be taking place at Windy Arm, not far from Cariboo Crossing, where a Mr. J. H. Conrad is opening and equipping several properties, including the construction of an aerial tram line, four miles in length. Already a quantity of ore has been shipped to the Ladysmith smelter, Vancouver Island, which has been found to be exceptionally rich.

Already from the Northern Gold Fields, including those of both United States and Canada, gold to the value of fifteen million dollars has been brought down and deposited with the United States Assay Office at Seattle. It is probable, however, that not more than a third of this amount has been derived from British sources.

The recently re-organized Five Fingers Coal Company has procured from the Government the use of a diamond drill plant, with which to prospect the property during the winter. Coal from this property has already been used in Dawson, and has been found to be of an excellent quality. Providing the exploration work proves satisfactory it is proposed to equip the mine with modern machinery.

It is reported from Dawson that the Government surveyors who are now in the field securing information for a proposed Government water system, will continue their investigations for some weeks yet, after which information will be compiled and submitted to the Ottawa authorities during the winter months, to admit of the commencement of actual construction operations in the spring.

A correspondent, writing on the developments in the Windy Arm quartz section, states that up to the present time more work has been done on the Montana mine than on other properties. Here a tunnel has been driven to a distance of over 250 feet, mostly through ore which gives extraordinary high values. This is now being shipped to the Coast smelter. Adjoining the Montana are the Mountain Hero and Glacier claims, and on the latter and 1,550 feet from the Montana tunnel is being run into the mountain side, which will tap the Montana tunnel.

The chief operator in this district is Mr. J. H. Conrad, who has re-organized a number of companies to operate the respective properties.

During August two new dredges in the Yukon, one, the larger of the two, on Bear Creek, and the other owned by the Canadian Dredging & Mining Company, at Ninety Below on Bonanza Creek. This dredge was constructed by the Risdon Iron Works at San Francisco, and is equipped with a 60 H.P. engine and a 70 H.P. locomotive boiler. There are 35 buckets, each of which carry 2 1-2 cubic feet of dirt. A special appliance on this dredge is an arrangement of nozzles, which are used to wash the buckets as they are emptied, in order to save the fine gold. The nominal capacity of the dredge is 2,000 yards per 24 hours.

A nugget, said to be worth \$614, has been found at Livingston Creek in the Big Salmon district. This is believed to be one of the largest nuggets found in the North for some time past.

## ZINC IN BRITISH COLUMBIA.

Mr. Jno. L. Retallack has addressed a letter to Mr. Phillip Argall, one of the Zinc Commissioners, in British Columbia, containing the following information in respect to the zinc resources of that province:

Zinc ores occur in commercial quantities in the following districts of this province; although production has been practically confined to the Slocan region:

West Kootenay:—In the following mining divisions: Ainsworth, including Ainsworth and Blue Bell camps, Kaslo district, and perhaps some of the creeks draining into the Lardo and Duncan rivers, Slocan, Nelson, Arrow Lake, Lardeau and Trout Lake.

East Kootenay:—In the Fort Steele and Golden mining divisions.

Coast—Lynn Creek, near Vancouver, and on Texada Island.

Vancouver Island:—Quatsino Sound and Hesquoat Harbor.

Mention is also made of occurrences in the Kamloops, Kettle River, and Similkameen mining divisions of Yale districts, which appear to deserve further enquiry.

So far as known zinc ore does not occur in commercial quantities in the following mining divisions: Windermere, Yale, Osoyoos, Revelstoke, Illecillewaet, Vernon, Ashcroft; regarding New Westminster, whilst the report of the mining recorder is negative, Lynn Creek and Texada Island are in this division.

As regards the detailed list of properties, I cannot give you my opinion as you request, but I believe that all the undermentioned deserve investigation. As before stated, I make no claim that this list is complete:

Ainsworth Mining Division:—Ainsworth Camp, Krao, United, Arkansas, Chief, Glengarry, Union, Last Chance, Tariff, Libby, Laura M., Gallagher, Ayesha; Blue Bell Peninsular, Blue Bell, Kootenay Chief, Comfort, Crawford Creek, Silver Hill, etc.; Kaslo district: Cork, Providence, Montezuma all on south fork of Kaslo Creek, Whitewater, Whitewater Deep, Wellington, Jackson Mines, Bell, on the south fork of Kaslo Creek, and some prospects in the vicinity of the last named property.

Slocan Mining Division:—Lucky Jim, Dardanelles, Rambler-Cariboo (not for its zinc values, but as an example of what is, here, deep development), Payne, Washington, Surprise, American Boy, Last Chance, Gray Copper, Slocan Star, Ruth, Ivanhoe, Monitor, Idaho, Mountain Chief, Bosun, Hewitt, Galena Farm, Wakefield, Enterprise, Emily Edith, Hartney, Sorinth.

Nelson Mining Division:—Molly Gibson mine and prospects in that vicinity.

Arrow Lake Mining Division:—Deposits on Bald Mountain, Pingston Creek, on west side of upper Arrow Lake, and prospects at Burton City.

Lardeau Mining Division:—Sirdar on Goat Mountain, Beatrice on Mohawk Creek.

Trout Lake Mining Division:—Various properties near Ferguson which, in producing a marketable silver or silver-lead product, have difficulty with the zinc tenor of their ores.

Fort Steele Mining Division:—St. Eugene Mine and Aurora on Moyie Lake, Estella group on Tracey Creek, Watson and Kootenay King on Wild Horse Creek. Some prospects and the operation of mines near Kimberley, might well enter into this inquiry.

Golden Mining Division:—Old Lanark Mine at Field, Giant on Similkameen Mountain.

For the Similkameen, Kettle River, Kamloops, New Westminster and Quatsino mining divisions, please see correspondence. The Lynn Creek deposits near Vancouver and the Peerless property on Murray Creek, Quatsino Sound are especially mentioned.

## THE NEW ZINC REDUCTION PLANT AT FRANK.

The new zinc smelting plant at Frank is now completed, and it is expected that the works will be in active operation within the next few weeks, when a general custom business will be conducted, while also ore from the Company's own properties in the Ainsworth district will be treated. In this connection the Sandom Mining Standard remarks:

The establishment of a domestic zinc smelter at Frank will by no means force the treatment of the zinc ores at home. Although the freight rate on the crude ore will be less to the home plant, the distance to market will be a serious item, and the difficulties attending the acquirement of a settled metallurgical practice will be many. When the freight to market is considered, with the expenses of marketing, the nearer market in the States, coupled with the competition of the plants who have the market at their door, will be a serious factor.

Already the local plant is realizing this, and is protecting itself by taking options on zinc ore prospects. This will render it independent of a source of supply by purchase. The natural tendency in tariff matters in the United States will be toward the reduction of duties on raw mate-



rial. Retaliation in trade matters will force them to reduce. All countries reduce first the duties on raw materials, and the need of foreign markets will force the United States into the same.

### BOUNTIES ON STEEL.

Under the act the following companies have earned Dominion Government bounties for the production and manufacture of steel in the Dominion during the years 1898-1905:—

|                                       |           |
|---------------------------------------|-----------|
| N. S. Steel Company .....             | \$276,278 |
| N. S. Steel and C. Co., Limited ..... | 596,693   |
| Mineral P. Co., Pictou, N.S., .....   | 7,378     |
| Dom. I. and S. Co., Limited .....     | 2,252,455 |
| Canada Iron Furnace Co. ....          | 447,657   |
| Ont. Rolling Mills Co. ....           | 18,712    |
| Ham. Blast Fur. Co. ....              | 203,080   |
| Ham. S. and I. Co., Limited .....     | 846,144   |
| Deseronto Iron Co. ....               | 133,134   |
| John McDougall and Co. ....           | 26,264    |
| Electric Reduction Co. ....           | 2,222     |
| Algoma Steel Co., Limited .....       | 328,740   |
| Londonderry I. and M. Co. ....        | 64,493    |
| Montreal Rolling Mills. ....          | 1,545     |

Total ..... \$5,204,755

### COPPER MARKET SITUATION.

The Journal of Commerce estimates in a recent issue that stocks in America have increased 26,000 tons since January 1, making a total stock of 80,000 tons on Oct. 1. But other reports show a material decrease during the past nine months, and based on the actions of the market our opinion is that the latter is more apt to be correct. The statistical position of this metal must always remain purely a matter of opinion until such a time as the copper producers resume their former policy of announcing their monthly output, with an annual or semi-annual statement of stocks on hand.

Messrs. H. A. Watson & Co., of Liverpool, report as follows:

"Intrinsically there is no change in the position of the metal; although consumers are naturally holding off the market for the present, trade generally continues to be good, and with the more important producers showing no inclination to reduce their limit, prices for refined copper have been well maintained.

"There is still a lack of confirmation of the report, of which so much has been made, that China is anxious to re-sell some of her recent purchases. It is quite possible that holders were tempted, when prices were at a high figure, to take a profit on copper not immediately needed, with the intention of replenishing their stocks later. It would appear, however, that the recent break has altered the position; in any case none of this copper is now apparently available.

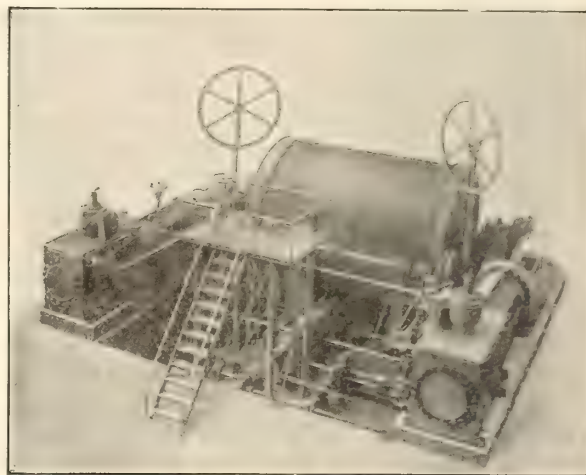
### INDUSTRIAL AND MACHINERY NOTES.

The Imperial Steel & Wire Company, of Collingwood, Ontario, contemplate erecting important additions to their factory at that place, the cost of which will not be less than \$100,000.

The De La Vergne Machine Company, East 138th Street, New York, send us a new catalogue, descriptive of the Koerting Four Cycle Gas Engine. This engine has been in commercial use since 1879, but has undergone numerous important improvements and is regarded to-day as a highly economical and efficient engine.

One important use for compressed air is in the operation of quarries. Messrs. Kelly Bros., of Winnipeg, have just purchased from Allis-Chalmers-Bullock, Limited, Montreal, six Haeseler Pneumatic Hammers for dressing stone. These will be operated by an Ingersoll-Sergeant Air Compressor, Class "E," driven by a twenty-five H.P. induction motor.

The Calumet & Arizona Mining Co., of Bisbee, Ariz., is installing a Sullivan Corliss Cross-Compound steam two-stage air compressor, with a total piston displacement of 3,660 cu. ft., which, on account of the altitude at which the compressor operates is equivalent to an actual delivered capacity of 2,700 cu. ft. of free air per minute, against a terminal pressure of 100 pounds per sq. in., while running at 83 H.P.M. This machine is expected to attain a very high efficiency, being designed to run condensing, and to operate when carrying its most economical load on 15.2 pounds dry steam per 1 H.P. per hour. The steam cylinders are seventeen inches and thirty-four inches, and air cylinders twenty inches and thirty-four inches in diameter, with a common stroke of forty-two inches. Rolling inlet valves controlled by independent eccentrics are used on

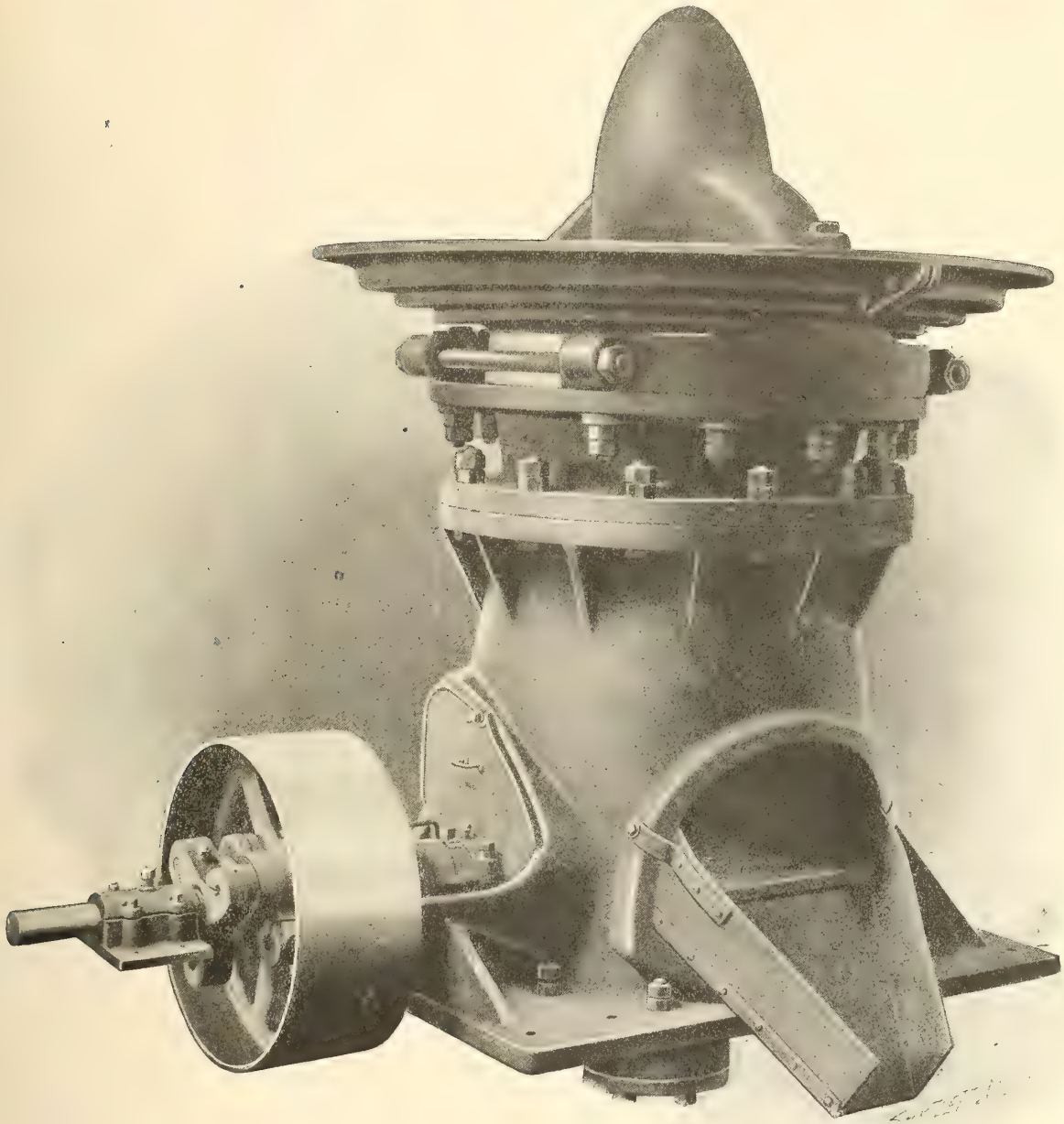


both the high and low pressure air cylinders. Rolling discharge valves are also used on the low pressure air cylinder. In addition to these, a number of automatic poppet discharge valves are used on the same cylinder. The high pressure air cylinder is equipped with a full set of removable automatic poppet discharge valves, which act in a direction parallel with the steam piston rod. An interesting feature is the automatic oiling system, which lubricates all the working parts regularly and without the attention of the engineer. The machine will be used for operating rock drills and other pneumatic tools about the mines. The company already has 3 class WB-2 Sullivan straight-line compressors, giving a total air supply of about 5,700 cu. ft. per minute.

**The Demand for Mechanical Stokers.**—That the mechanical stoker has reached such a state of perfection as to be considered indispensable in the equipment of modern boiler plants is indicated by the large number of orders booked by the Westinghouse Machine Company for the Roney stoker, a type of their exclusive manufacture. During the past ten years this company has developed the Roney stoker by successive improvements until it has become capable of meeting successfully all the requirements of heavy modern service. During the past month orders have been received for no less than 51 Roney mechanical stokers, ranging in size from 54 inches x 20 grate to 132 inches x 26 grate, the largest of the orders being that of the Pennsylvania Railroad for six 132 inches x 26 grate stokers and five 100 inches x 20 grate stokers. A large order from the Ohio Hospital for Epileptics at Gallipolis, Ohio, has also been received and others from the American Bridge Company, Ambridge, Pa.; National Tube Company, Pittsburg, Pa.; Detroit United Railway Company, Detroit; Mich.; York Engineering Company, York, Pa.; Proctor & Gamble Company, Cincinnati, Ohio; The Union Rolling Company, Cleveland, Ohio; Gulfport and Mississippi Coast Traction Company, Gulfport, Miss.; United Presbyterian Board of Publication, Pittsburg, Pa.; Indiana Boys' School, Plainfield, Ind.; B. & O. Office Building at New York City and the Railway Exchange Building at Chicago, Ill.



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To reduce rock for finer crushing or pulverizing by stamps, rolls or Huntington mills; for fluxing purposes in smelting plants; for railway ballast and the production of cement and concrete the Gates "K" Gyratory Breaker is unequalled. It is the only machine built so as to be driven at right angles to the discharge opening, as here shown. This permits of a very compact arrangement of a plant, enables more than one breaker to discharge into the same elevator, and does away with expensive transmission machinery. See Catalogue 110.

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**COMPRESSORS & BLOWING ENGINES.**

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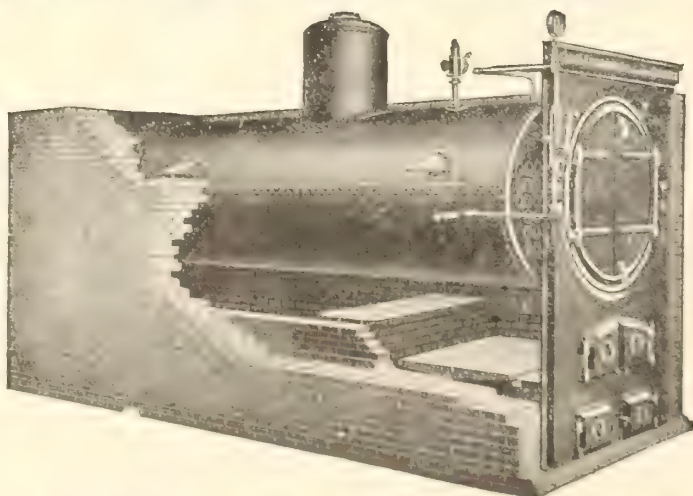
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The attention of Miners and Capitalists in the United States  
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## GREAT MINERAL TERRITORY

Open for investment in the Province of Quebec.

**Gold, Silver, Copper, Iron, Asbestos, Mica, Plumbago, Phosphate,  
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**ORNAMENTAL AND STRUCTURAL MATERIALS IN ABUNDANT VARIETY,**

**The Mining Law gives absolute security to Title, and has been  
specially framed for the encouragement of Mining.**

Mining concessions are divided into three classes:—

1. In unsurveyed territory (a) the first class contains 400 acres, (b) the second, 200 acres, and (c) the third, 100 acres.

2. In surveyed townships the three classes respectively comprise one, two and four lots.

All lands supposed to contain mines or ores belonging to the Crown may be acquired from the Commissioner of Colonization and Mines (a) as a mining concession by purchase, or (b) be occupied and worked under a mining license.

No sale of mining concessions containing more than 400 acres in superficies can be made by the Commissioner to the same person. The Governor-in-Council may, however, grant a larger extent of territory up to 1,000 acres under special circumstances.

The rates charged and to be paid in full at the time of the purchase are \$5 and \$10 per acre for mining lands containing the superior metals\*; the first named price being for lands situated more than 12 miles and the last named for lands situated less than 12 miles from the railway.

If containing the inferior metal, \$2 and \$4 according to distance from railway.

Unless stipulated to the contrary in the letters patent in concessions for the mining of superior metals, the purchaser has the right to mine for all metals found therein; in concessions for the mining of the inferior metals, those only may be mined for.

\* The superior metals include the ores of gold, silver, lead, copper, nickel, graphite, asbestos, mica, and phosphate of lime. The words inferior metals include all other minerals, and ores.

Mining lands are sold on the express condition that the purchaser shall commence bona fide to mine within two years from the date of purchase, and shall not spend less than \$500 if mining for the superior metals; and not less than \$200 if for inferior metals. In default, cancellation of sale of mining lands.

(b) Licenses may be obtained from the Commissioner on the following terms:—Application for an exploration and prospecting license, if the mine is on private land, \$2 for every 100 acres or fraction of 100; if the mine is on Crown lands (1) in surveyed territory, \$5 for every 100 acres, and (2) in unsurveyed territory, \$5 for each square mile, the license to be valid for three months and renewable. The holder of such license may afterwards purchase the mine, paying the prices mentioned.

Licenses for mining are of two kinds: Private lands licenses where the mining rights belong to the Crown, and public lands licenses. These licenses are granted on payment of a fee of \$5 and an annual rental of \$1 per acre. Each license is granted for 200 acres or less, but not for more; is valid for one year, and is renewable on the same terms as those on which it was originally granted. The Governor-in-Council may at any time require the payment of the royalty in lieu of fees for a mining license and the annual rental—such royalties, unless otherwise determined by letters patent or other title from the Crown, being fixed at a rate not to exceed three per cent. of the value at the mine of the mineral extracted after deducting the cost of mining it.

The fullest information will be cheerfully given on application to

**THE MINISTER OF LANDS, MINES AND FISHERIES,**

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# Ontario's

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## Mining

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### Lands..

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THE Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals and extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and sulphides; zincblende, galena, pyrites, mica, graphite, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places, and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. Recent discoveries of corundum in Eastern Ontario are believed to be the most extensive in existence.

The output of iron, copper and nickel in 1903 was much beyond that of any previous year, and large developments in these industries are now going on.

In the older parts of the Province salt, petroleum and natural gas are important products.

The mining laws of Ontario are liberal, and the prices of mineral lands low. Title by freehold or lease, on working conditions for seven years. There are no royalties.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific Railway runs through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

HON. FRANK COCHRANE,

Commissioner of Lands and Mines.

OR

THOS. W. GIBSON,

Director Bureau of Mines,

Toronto, Ontario.





## PROVINCE OF NOVA SCOTIA.

Leases for Mines of Gold, Silver, Coal, Iron, Copper, Lead, Tin

— AND —

## PRECIOUS STONES.

TITLES GIVEN DIRECT FROM THE CROWN, ROYALTIES AND RENTALS MODERATE.

### GOLD AND SILVER.

Under the provisions of Chap. 1, Acts of 1892, of Mines and Minerals, Licenses are issued for prospecting Gold and Silver for a term of twelve months. Mines of Gold and Silver are laid off in areas of 150 by 250 feet, any number of which up to one hundred can be included in one License, provided that the length of the block does not exceed twice its width. The cost is 50 cents per area. Leases of any number of areas are granted for a term of 40 years at \$2.00 per area. These leases are forfeitable if not worked, but advantage can be taken of a recent Act by which on payment of 50 cents annually for each area contained in the lease it becomes non-forfeitable if the labor be not performed.

Licenses are issued to owners of quartz crushing mills,

who are required to pay Royalty on all the Gold they extract at the rate of two per cent. on smelted Gold valued at \$19 an ounce, and on smelted Gold valued at \$18 an ounce.

Applications for Licenses or Leases are receivable at the office of the Commissioner of Public Works and Mines each week day from 10 a.m. to 4 p.m., except Saturday, when the hours are from 10 to 1. Licenses are issued in the order of application according to priority. If a person discovers Gold in any part of the Province, he may stake out the boundaries of the areas he desires to obtain, and this gives him one week and twenty-four hours for every 15 miles from Halifax in which to make application at the Department for his ground.

### MINES OTHER THAN GOLD AND SILVER.

Licenses to search for eighteen months are issued, at a cost of thirty dollars, for minerals other than Gold and Silver, out of which areas can be selected for mining under lease. These leases are for four renewable terms of twenty years each. The cost for the first year is fifty dollars, and an annual rental of thirty dollars secures each lease from liability to forfeiture for non-working.

All rentals are refunded if afterwards the areas are worked and pay royalties. All titles, transfers, etc., of minerals are registered by the Mines Department for a nominal fee, and provision is made for lessees and licensees whereby they can acquire promptly, either by arrangement with the owner or by arbitration, all land required for their mining works.

The Government as a security for the payment of royalties, makes the royalties first lien on the plant and fixtures of the mine.

The unusually generous conditions under which the Government of Nova Scotia grants its minerals have introduced many outside capitalists, who have always stated that the Mining laws of the Province were the best they had had experience of.

The royalties on the remaining minerals are: Copper, four cents on every unit; Lead, two cents upon every unit; Iron, five cents on every ton; Tin and Precious Stones, five per cent.; coal, 10 cents on every ton sold.

The Gold district of the Province extends along its entire Atlantic coast, and varies in width from 10 to 40 miles, and embraces an area of over three thousand miles, and is traversed by good roads and accessible at all points by water. Coal is known in the Counties of Cumberland, Colchester, Pictou and Antigonish, and at numerous points in the Island of Cape Breton. The ores of Iron, Copper, etc., are met at numerous points, and are being rapidly secured by miners and investors.

Copies of the Mining Law and any information can be had on application to

THE HON. W. T. PIPES,

Commissioner Public Works and Mines,

HALIFAX, NOVA SCOTIA.



# DOMINION OF CANADA

## SYNOPSIS OF REGULATIONS

### For disposal of Minerals on Dominion Lands in Manitoba, the North-West Territories and the Yukon Territory.

#### COAL.

Coal lands may be purchased at \$10 per acre for soft coal and \$20 for anthracite. Not more than 320 acres can be acquired by one individual or company. Royalty at the rate of ten cents per ton of 2,000 pounds shall be collected on the gross output.

#### QUARTZ.

Persons of eighteen years and over and joint stock companies holding free miner's certificates may obtain entry for a mining location.

A free miner's certificate is granted for one or more years, not exceeding five, upon payment in advance of \$7.50 per annum for an individual, and from \$50 to \$100 per annum for a company, according to capital.

A free miner, having discovered mineral in place, may locate a claim 1,500 x 1,500 feet by marking out the same with two legal posts, bearing location notices, one at each end on the line of the lode or vein.

The claim shall be recorded within 15 days if located within ten miles of a mining recorder's office, one additional day allowed for every additional ten miles or fraction. The fee for recording a claim is \$5.

At least \$100 must be expended on the claim each year or paid to the mining recorder in lieu thereof. When \$500 has been expended or paid, the locator may, upon having a survey made, and upon complying with other requirements, purchase the land at \$1.00 an acre.

Permission may be granted by the Minister of the Interior to locate claims containing iron and mica, also copper, in the Yukon Territory of an area not extending 160 acres.

The patent for a mining location shall provide for the payment of a Royalty of 2½ per cent. of the sales of the products of the location.

#### PLACER MINING.

Manitoba and the N. W. T., excepting the Yukon Territory.—Placer mining claims generally are 100 feet square; entry fee \$5, renewable yearly. On the North Saskatchewan River claims are either bar or bench, the former being 100 feet long and extending between high and low water mark. The latter includes bar diggings, but extends back to the base of the hill or bank, but not exceeding 1,000 feet. Where steam power is used, claims 200 feet wide may be obtained.

Dredging in the rivers of Manitoba and the N. W. T., excepting the Yukon Territory.—A free miner may obtain only two leases of five miles each for a term of twenty years, renewable in the discretion of the Minister of the Interior.

The lessee's right is confined to the submerged bed or bars of the river below low water mark, and subject to the rights of all persons who have, or who may receive entries for bar diggings or bench claims, except on the Saskatchewan River, where the lessee may dredge to high water mark on each alternate leasehold.

The lessee shall have a dredge in operation within one season from the date of the lease for each five miles, but where a person or company has obtained more than one lease one dredge for each fifteen miles or fraction is sufficient. Rental, \$10 per annum for each mile of river leased. Royalty at the rate of two and a half per cent. collected on the output after it exceeds \$10,000.

Department of the Interior.

Ottawa, February, 1904.

#### DREDGING IN THE YUKON TERRITORY.

Six leases of five miles each may be granted to a free miner for a term of twenty years, also renewable.

The lessee's right is confined to the submerged bed or bars in the river below low water mark, that boundary to be fixed by its position on the 1st day of August in the year of the date of the lease.

The lessee shall have one dredge in operation within two years from the date of the lease, and one dredge for each five miles within six years from such date. Rental, \$100 per mile for first year and \$10 per mile for each subsequent year. Royalty, same as placer mining.

#### PLACER MINING IN THE YUKON TERRITORY.

Creek, gulch, river and hill claims shall not exceed 250 feet in length, measured on the base line or general direction of the creek or gulch, the width being from 1,000 to 2,000 feet. All other placer claims shall be 250 feet square.

Claims are marked by two legal posts, one at each end, bearing notices. Entry must be made within ten days, if the claim is within ten miles of mining recorder's office. One extra day allowed for each additional ten miles or fraction.

The person or company staking a claim must hold a free miner's certificate.

The discoverer of a new mine is entitled to a claim of 1,000 feet in length, and if the party consists of two, 1,500 feet altogether, on the output of which no royalty shall be charged, the rest of the party ordinary claims only.

Entry fee, \$10. Royalty at the rate of two and one-half per cent. on the value of the gold shipped from the Yukon Territory to be paid to the Comptroller.

No free miner shall receive a grant of more than one mining claim on each separate river, creek or gulch, but the same miner may hold any number of claims by purchase, and free miners may work their claims in partnership by filing notice and paying fee of \$2. A claim may be abandoned, and another obtained on the same creek, gulch or river, by giving notice and paying a fee.

Work must be done on a claim each year to the value of at least \$200.

A certificate that work has been done must be obtained each year; if not, the claim shall be deemed to be abandoned, and open to occupation and entry by a free miner.

The boundaries of a claim may be defined absolutely by having a survey made and publishing notices in the Yukon Official Gazette.

#### PETROLEUM.

All unappropriated Dominion Lands in Manitoba, the North-West Territories and within the Yukon Territory are open to prospecting for petroleum, and the Minister may reserve for an individual or company having machinery on the land to be prospected, an area of 640 acres. Should the prospector discover oil in paying quantities, and satisfactorily establish such discovery, an area not exceeding 640 acres, including the oil well and such other land as may be determined, will be sold to the discoverer at the rate of \$1.00 an acre subject to royalty at such rate as may be specified by order-in-council.

W. W. CORY,

Deputy of the Minister of the Interior



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makes economical mining and the deepest hole can be drilled at the smallest cost by a

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It can cut through 2,500 feet of solid rock in a vertical line. It brings up solid cylinders of rock, showing formation and character.

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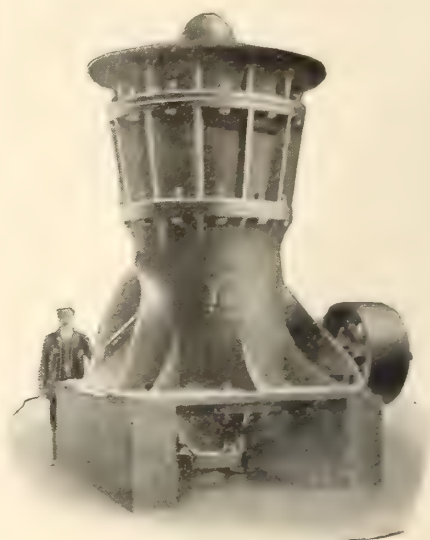
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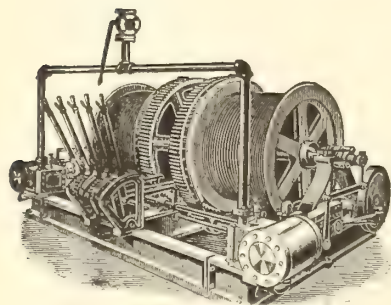
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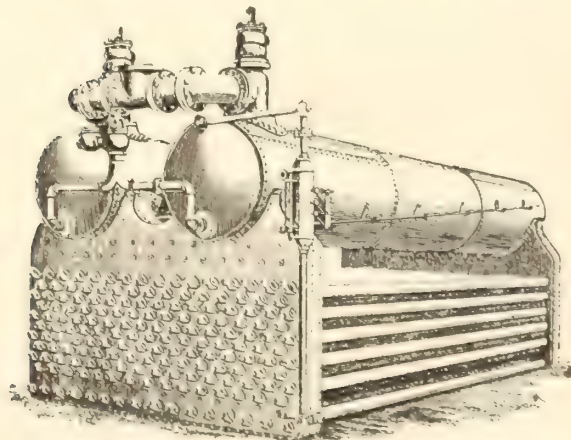
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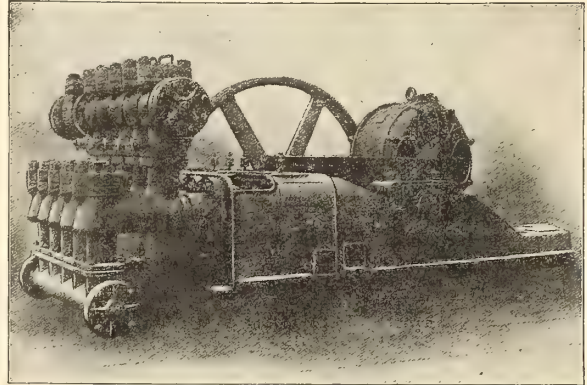


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### Increase Production Decrease Costs

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WESTINGHOUSE INDUCTION MOTOR  
Driving Allentown Quintuplex Mine Pump

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## Sydney Mines Bituminous Coal

Unexcelled Fuel for Steamships and Locomotives, Manufactories, Rolling Mills, Forges, Glass Works, Brick and Lime Burning, Coke, Gas Works, and for the Manufacture of Steel, Iron, etc.

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Pit Rails, Tee Rails, Edge Rails, Fish Plates, Bevelled Steel Screen Bars, Forged Steel Stamper Shoes and Dies, Blued Machinery Steel  $\frac{3}{8}$ " to  $\frac{1}{4}$ " Diameter, Steel Tub Axles Cut to Length, Crow Bar Steel, Wedge Steel, Hammer Steel, Pick Steel, Draw Bar Steel, Forging of all kinds, Bright Compressed Shafting  $\frac{5}{8}$ " to 5" true to  $\frac{2}{1000}$  part of one inch.

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A FULL STOCK OF MILD FLAT, RIVET-ROUND AND ANGLE STEELS ALWAYS ON HAND.

Special Attention Paid to Miners' Requirements.

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GLACE BAY, C.B., CANADA

### MINERS OF

#### BITUMINOUS COALS

The celebrated "Reserve"  
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And the best steam coal from its  
Collieries on the Phalen seam.

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Shipping facilities at Sydney and Louisburg, C.B., of most modern type. Steamers carrying 5,000 tons loaded in twenty-four hours. Special attention given to quick loading of sailing vessels. Small vessels loaded with quickest despatch.

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By improved screening appliances, lump coal for domestic trade is supplied, of superior quality. Prices, terms, etc., may be obtained at the offices of the Company.

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Rubber Belting, Fire Hose, Steam and Air Hose, High Pressure  
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The standard of excellence in Bituminous  
Coal and Coke for Blast Furnaces, Foundries,  
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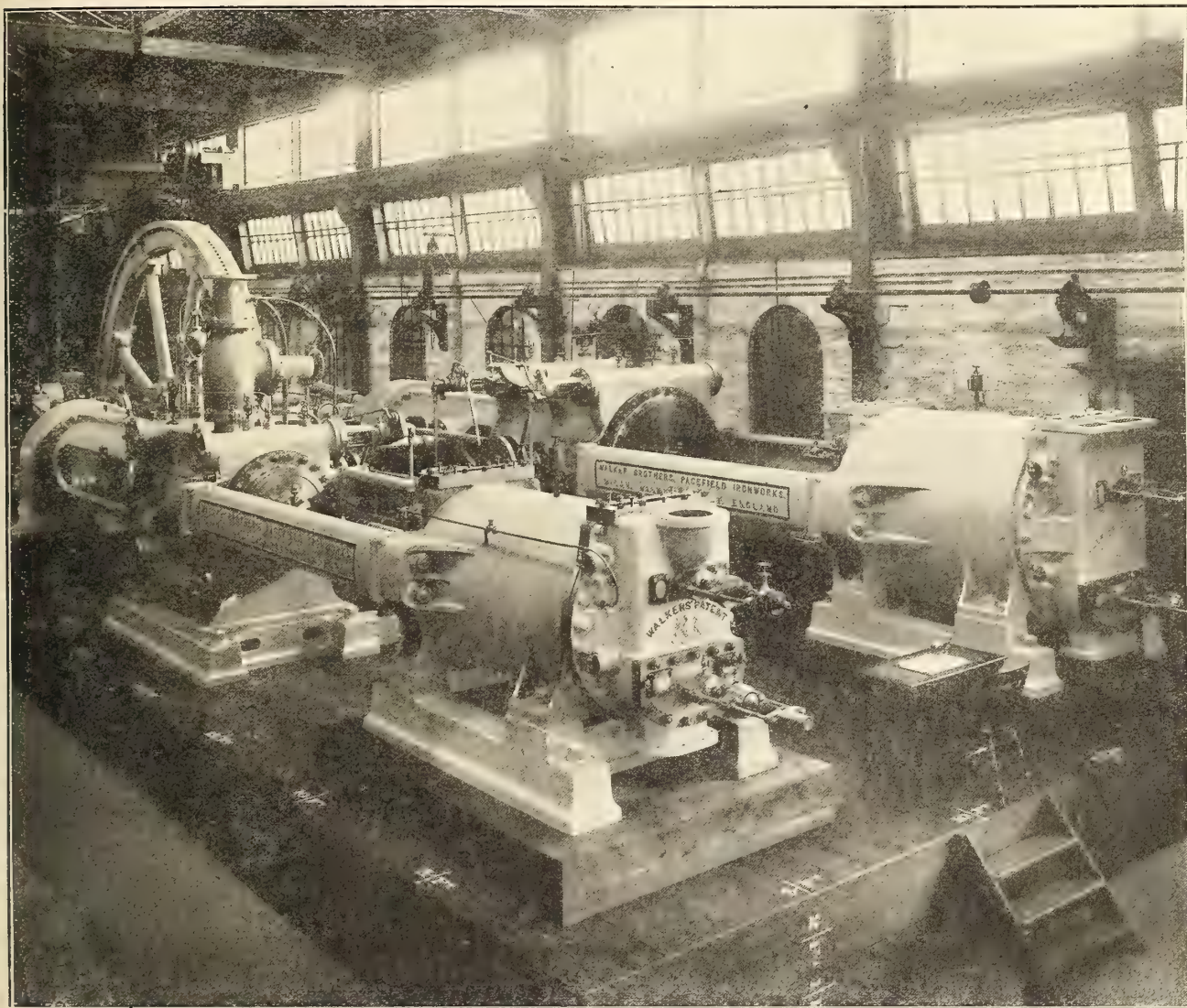
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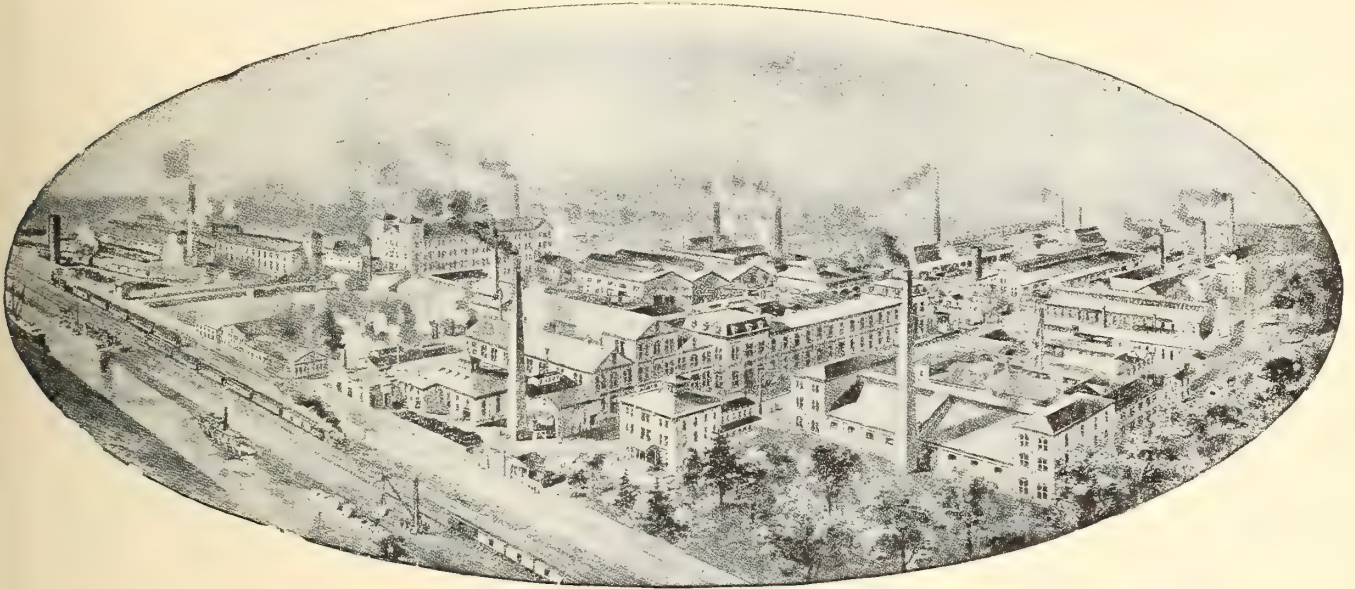
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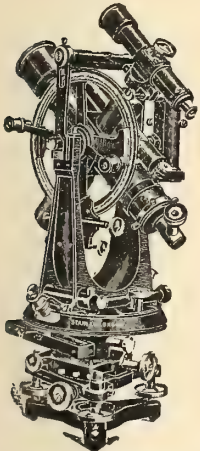


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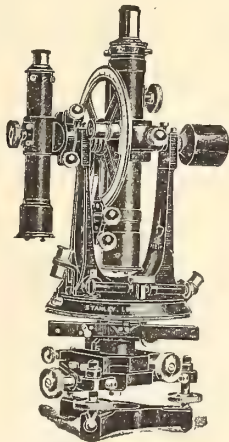
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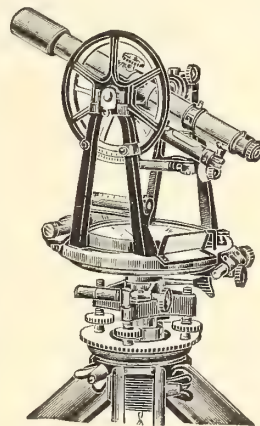
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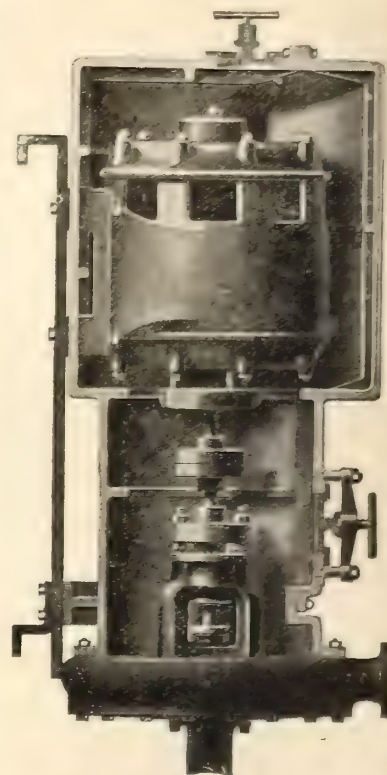
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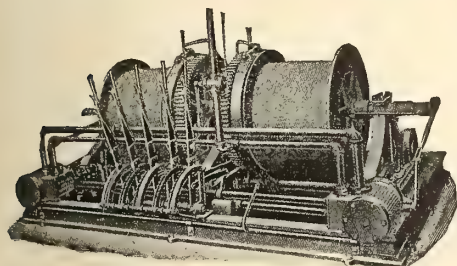


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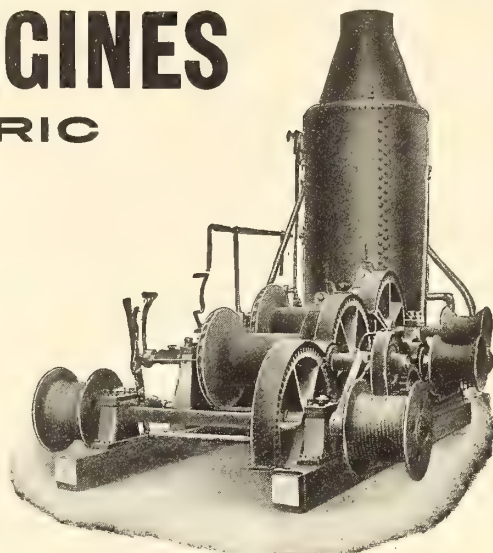
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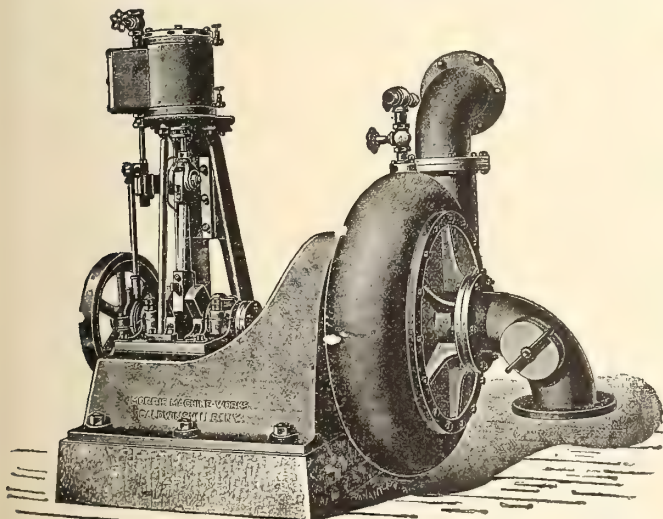
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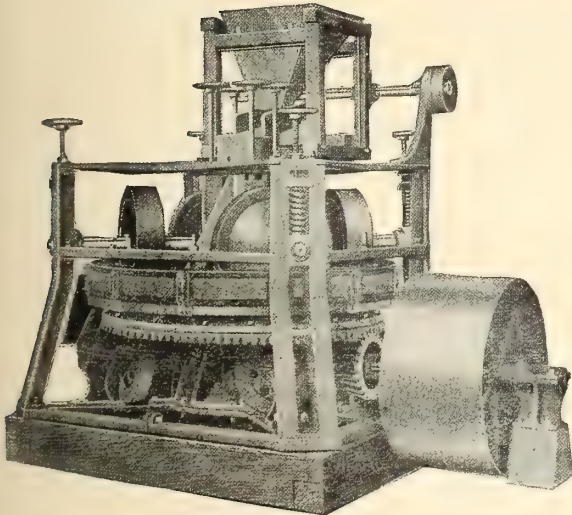
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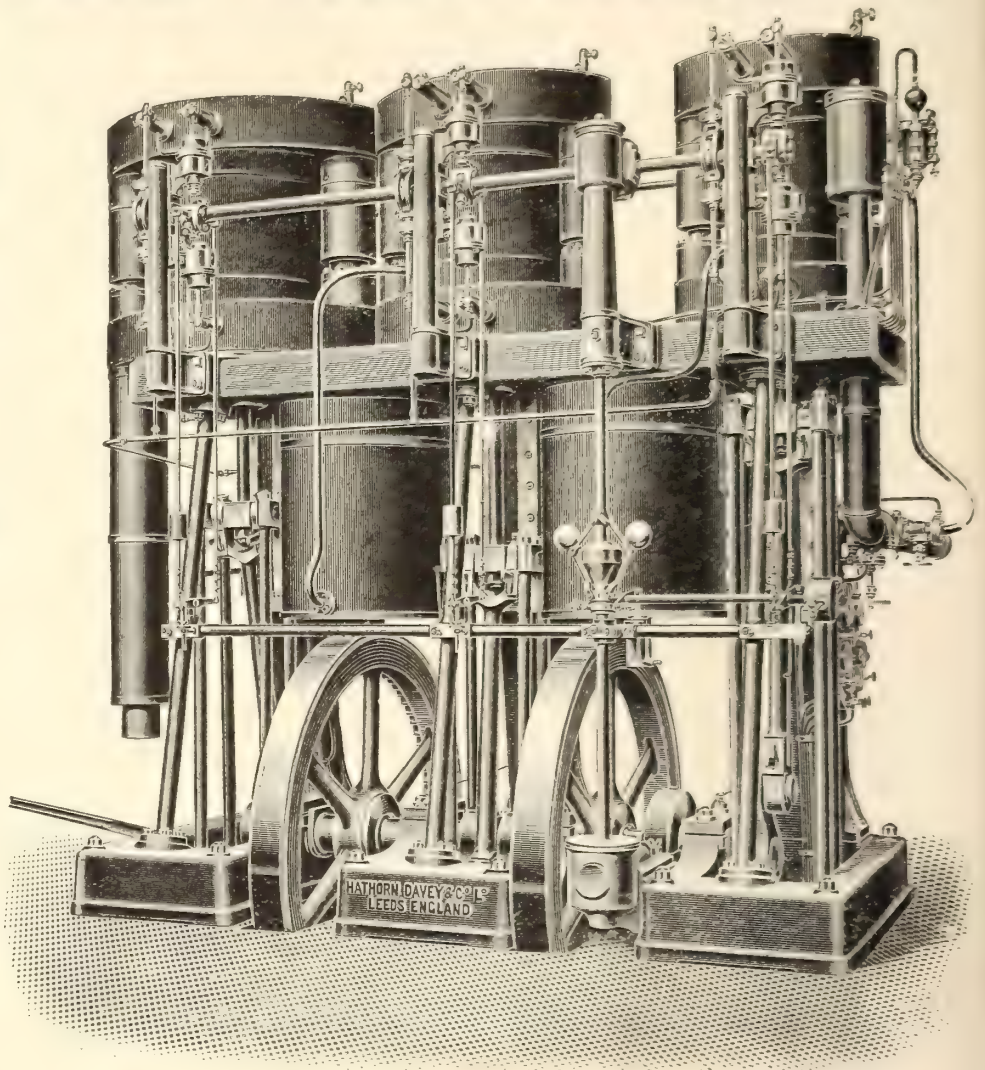
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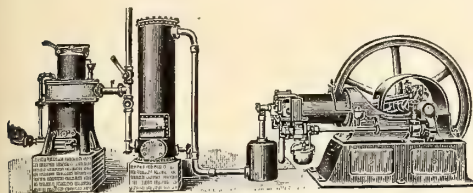
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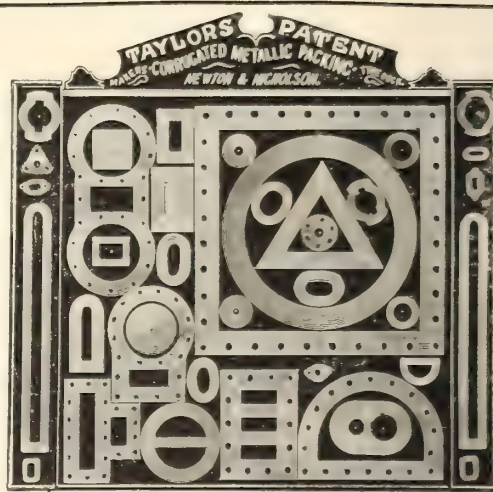


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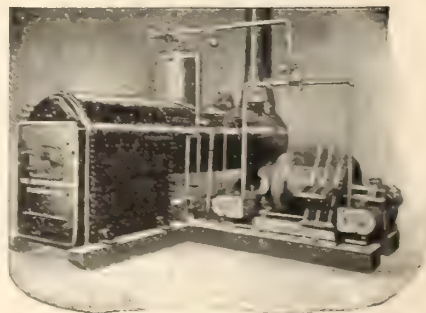
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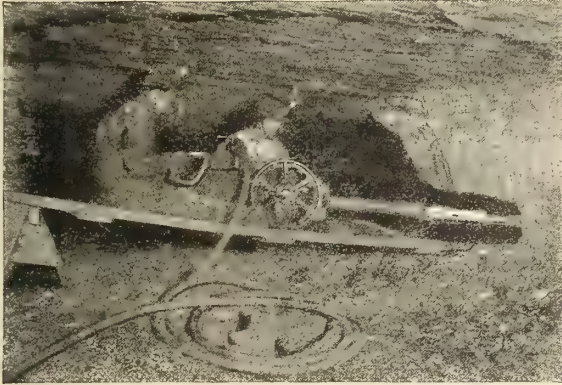
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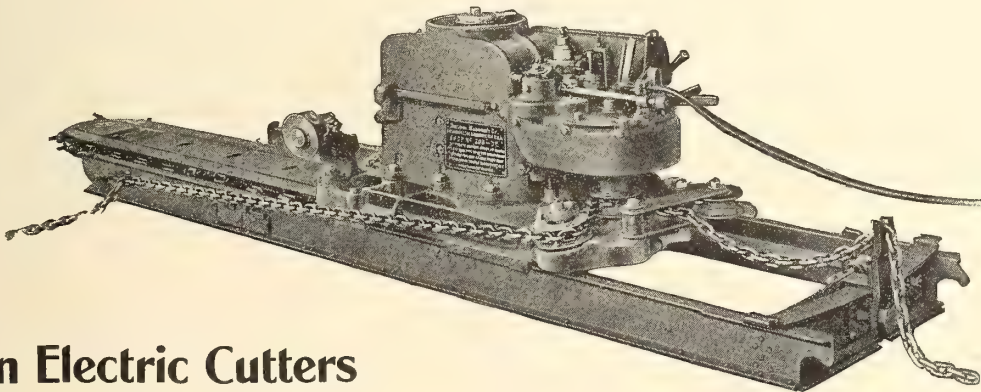
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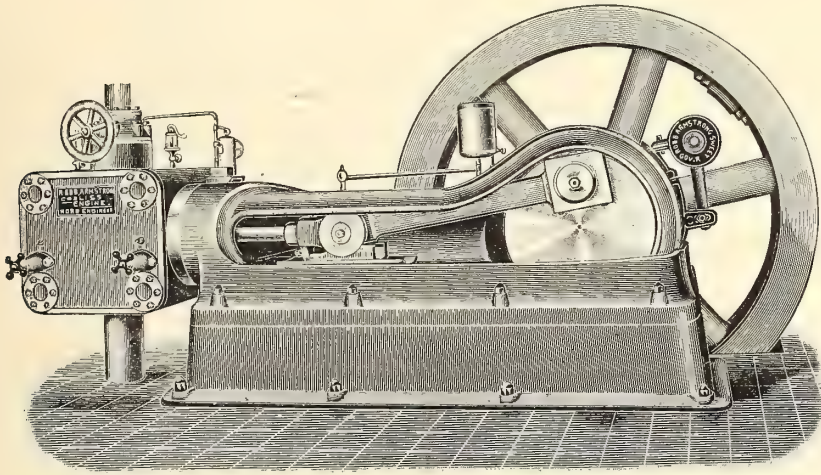
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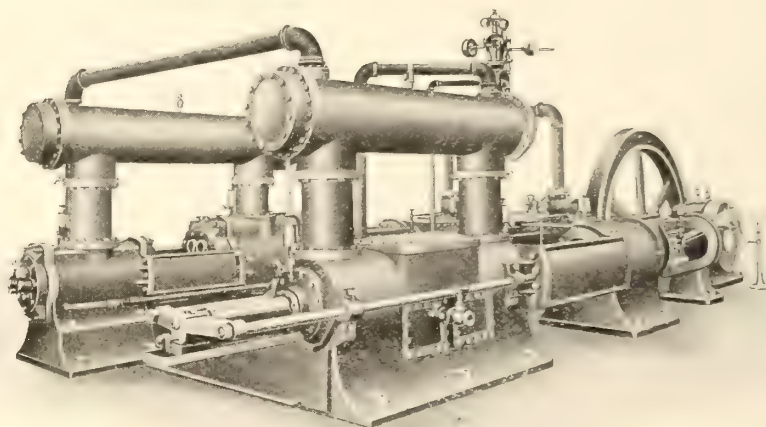
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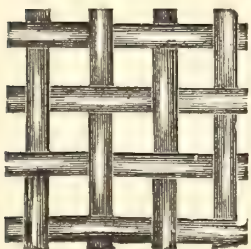
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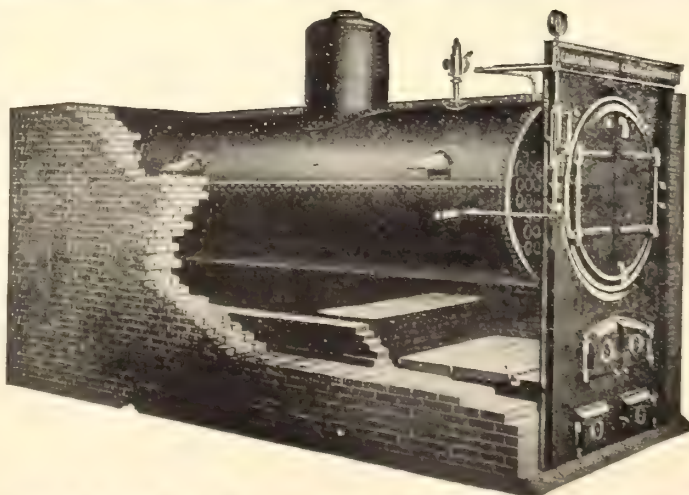
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Established 1882

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The Mines Branch of the Department of the Interior, under Dr. Haanel, has commenced the publication of a series of monographs on the economic minerals of Canada, of which the first two, just issued, deal respectively with mica and asbestos, and are prepared by Mr. Fritz Cirkel, M.E., of Montreal, who has devoted much attention and special study to these subjects. We have not the time nor the space to review these reports in this

issue, but from a casual glance through them, they appear to us to contain much exceedingly useful information, concisely put together. It is now many years since we first urged on the Department the importance of undertaking a work of this character, and it is therefore gratifying to know that our constant advocacy has at length borne fruit. We congratulate Dr. Haanel on his initiative.

"Fairy tales, fairy tales, beautiful fairy tales." Such was the refrain of a comic opera ditty, popular a year or so ago. But as one reads the local newspapers of the country, the great fundamental truths this charming song teaches, hid though they be under a flippant expression, come deeply home to us, and extract from a heaving bosom the regretful sigh. The dear gullible public dearly loves to be gulled, and like the good caterer that it is, the press serves up its little odoriferous and spiced delicacies of fiction in and out of season. Then comes a disagreeable dyspeptic interloper, by disposition unromantic, and forthwith besprinkles that fair dish with the carbolic acid of truth, so that it may no longer be swallowable. What a shame, then, to declare that the great discovery of diamonds in New Ontario is but a mere canard!

The *Suburban*, published at Rockingham, N.S., strongly advocates the appointment by the Nova Scotian Government of a duly qualified official to "look after the iron interests of the province with a view more especially to encouraging the development of native ores." Our contemporary suggests that it is not sufficient to make a mere temporary appointment to admit of an enquiry as to existing conditions and resources, but that the discovery, exploration and utilization of local iron ore deposits, in addition to those now known to occur, is a matter of such paramount importance that money would be well spent in retaining the services of a competent iron expert as a permanent member of the staff of the Mines' Department. The suggestion of a permanent official at this stage is hardly a happy one, but an investigation by a disinterested competent "outside" man would no doubt serve a good purpose.

Reports from the Atlin gold area in Northern British Columbia indicate that the past season has again afforded exceptionally good results, the gold yield having, it is estimated, largely exceeded last year's production of \$530,000. The day of the individual miner is now, however, practically over, and the future of the district is entirely dependent on successful operation by big corporations using the most modern and economical gold-saving methods. The success of dredging appears meanwhile to be reasonably well assured, the British America Dredging Company having obtained, it is stated, this season promising results,—as much as \$3,000 having been recovered in a run of twelve hours. Another dredge commenced work in September; while much is hoped from the use of steam shovels, a first plant of this character having been installed by the Northern Mines, Ltd., during the summer. Some large clean-ups were also made by hydraulic companies operating in the district during the season, one undertaking being credited with a recovery of \$150,000, and another of \$60,000.

As a number of erroneous or inaccurate reports have been circulated in connection with the offer made by the Dominion Government to Dr. F. D. Adams, to assume the Directorship of the Geological Survey of Canada, it is perhaps advisable to mention the circumstances which compelled him, to the great regret of so many of his friends among the mining men of the country, to decline the appointment. Dr. Adams occupies as, of course, is well known, the Chair of Geology at McGill University, and enjoys in a high measure the confidence of the Faculty and the respect of the students who are privileged to take his course of lectures. He himself realizes that in this capacity he is performing a work of great usefulness and he therefore feels that he would not be warranted in resigning a duty which is interesting and congenial, to undertake the trust offered him in the Government service, unless he were assured that the conditions were such as would enable him to achieve a notable success in that field. After, therefore, giving the matter careful thought, Dr. Adams has finally decided to remain at his present

Outsiders, it is a well known saying, often see more of the game than the players thereof. We consider it therefore worth while to extract the following paragraph from a recent leading article published in the *Mining Reporter* of Denver, Colorado: "The rehabilitation of the mining industry in Canada is being accomplished rapidly and there are many instances of a progressive spirit in this respect. Not the least of these is the announced decision of the Ontario Government to revise the mining laws for that province. While this will be no slight task, it will be no less welcome to those in the mining industry. Indeed the recent discoveries of rich cobalt and silver ores in the Timiskaming

district have given rise to some incidents which seem to make such a revision imperative and the readiness with which the task is taken up is commendable. That there are many other opportunities for improvement and reform is of course apparent to many who have been closely identified with mining in different parts of the Dominion, but we believe that we may safely rely on the evidences of an alert and progressive spirit to remedy these difficulties in the order of their relative importance."

It is a matter of regret to note that The Port Hood Coal Co., in Inverness County, C.B., is in the hands of the Eastern Trust Company, as trustee for the bondholders. The company's trouble in the past, was that the cost of production was so near the selling price that there remained no margin of profit, sufficient even for payment of fixed charges. In consequence debts accumulated and formed a burden under which relief was only possible by putting matters in the hands of a receiver. The present manager, Mr. R. J. Bell, is represented to be efficient, economical and energetic, and under his administration the condition of the mine has greatly improved in all respects. It is now able to maintain a continuous daily output of 500 to 600 tons, at a cost price so far below selling price as to yield a fair profit if the accumulated fixed charges were removed. Some criticism has been made, and perhaps justly, that the size of the staff was disproportionate to the output, and should be cut down. All such matters will undoubtedly be dealt with when reorganization is attempted. Other properties in Inverness County are likewise suffering from insufficient capital or deficient plant, so that the production for 1905 will fall far short of the yield made in 1904.

Ever since the seventies of the last century there have been occasional newspaper references to occurrences of oil on Manitoulin Island and, sporadically, holes have been bored in the hope of finding an oil field. During the last six or seven years this boring has been more or less continuous, without satisfactory results, until this last midsummer, when the hole bored on the Wikwimakong Indian Reserve showed a good quality and a large quantity of crude petroleum. Three or four holes were drilled to the south, and were all dry, but recently a hole was put down to the east of this first hole and the result is that a small gusher has now been struck that flowed several hundred barrels of oil in a few days. The oil was accompanied with a large volume of gas under high pressure, so that the well, in the language of the oil region, was both a "roarer" and a "gusher." The bulk of the gas has now escaped and the flow from the well is averaging between fifty and one hundred barrels per day. This well is important as indicating a probable addition of oil bearing lands to the oil fields of Canada. The shallow wells of the peninsula have been averaging



perhaps two to three barrels of oil per day each, by pumping; and during the last two or three years many wells have been sunk to a greater depth than formerly, in the hope of finding a second reservoir of oil at greater depth. This new field, if found to be permanent, will add greatly to Ontario's petroleum resources and will undoubtedly lengthen the life of the province as an oil producing country.

An unconfirmed rumor has it that the two deposits of hematite which are now working on Bell Island, Newfoundland, by the Nova Scotia Steel & Coal Co., and the Dominion Iron & Steel Company, respectively, have been found in place on both sides of Conception Bay, in which is situated Bell Island. It is understood that the first discovery was accidental, and was made near Clarke's Beach. Samples taken from this discovery, when examined at the works of the Nova Scotia Steel Company, are said to have been pronounced richer in iron than the seams now being worked. The two beds now working on the Island average approximately fifty per cent. of metallic iron (running, as a matter of fact, from 48 to 54 per cent.); the samples from the new find are reported to average 55 per cent. of metallic iron. The importance of this report, should it be proved true in every particular, can not be overestimated in its influence upon the future of the iron and steel trade of the Dominion. The present satisfactory condition of the two plants situated on the Atlantic seaboard is evidence of the demand in Canada for the class of material they manufacture. The weakness of both corporations has always been that the character of the chief supply of ore necessitated an admixture of foreign ores in order to produce commercial brands of pig iron, so that the importation of many thousands of tons of foreign ore in the past has formed a conspicuous item in the annual reports of both companies. The advent of a higher grade of ore, of possibly different composition, will be most gratifying to the management of both companies. We hope in our next issue to be able to give fuller details of this alleged find.

The Lake Superior Corporation, as our readers are aware, is the successor to the Consolidated Lake Superior Corporation, which was proclaimed bankrupt about two years ago. The affairs of the re-constructed undertaking have, under new and conservative management, been put in good order, and the directors have just issued a report, published in another column, with which the shareholders have every reason to be satisfied. With the exception of a few disputed claims, the old indebtedness has now been liquidated, and the company will have, after the final settlements shall have been made, the balance of the treasury bonds in hand, amounting to probably over a million dollars, for the uses of the corporation. In the commendable desire to restore confidence in the undertaking and avoid even a semblance of "making a showing,"

the directors in presenting a statement of accounts have even erred on the side of over-cautiousness, and we are justified in stating that income might quite properly have been credited with an additional amount of approximately \$100,000. Again, the valuation at which the assets have been placed is the lowest possible one, and in this year's statement have been included and charged against the year's operations all the extraordinary expenses incidental to re-organization and the rehabilitation of works and property. We regard the future of the Company as being exceptionally promising, and with the high prices now obtainable for steel, and the present considerable demand for that product, the company starts a new year under peculiarly favorable auspices. It is also satisfactory to learn that recent developments at the Helen mine have appreciably increased the value of that property.

In a recent letter to one of our readers, who is greatly interested in the subject of electro-metallurgy of iron, Professor Jos. W. Richards, the head of the department of electro-metallurgy of Lehigh University and President of the Electro-Chemical Publishing Company, writes:—"I believe you are on the eve of some surprising results in electric furnace work. All that is now needed is the perfection of the electric furnace, so that it will run regularly and produce a steady quality of iron on a large scale. Perfect the furnace so that it runs as regularly as a blast furnace and you have the latter beaten, even *where fuel is cheap*. The reason: only  $\frac{1}{4}$  ton of fuel is theoretically needed in the electric furnace per ton of pig iron, the issuing gases can all be used in gas engines to produce power and  $\frac{1}{4}$  ton of fuel can be saved per ton of pig iron, including the fuel burnt for power. The only stumbling block now is the imperfection of the electric furnace as a metallurgical apparatus—its efficiency is all that could be desired."

The views of so eminent an authority are necessarily interesting and valuable; and it is worthy of note that Prof. Richards at once places his finger on the weak spot in regard to the immediate successful application of electric smelting to commercial uses. Meanwhile, it is unquestionably advantageous that all the possibilities entering into the commercial production of pig iron by the electric process should be proved, and as the commission appointed by the Dominion Government was not in a position to have made at the time several experiments, which suggest themselves as likely to settle certain important points, the erection of the experimental plant at Sault Ste. Marie upon the recommendation of the Superintendent of Mines is well justified. The results of the experiments that are to be made, will, it is believed, settle authoritatively some points that were not touched on by the commission, and whatever they may prove to be, cannot fail to add to the general knowledge of the subject of electro-metallurgy.

The report of the Directors of the Granby Company for the year ending June 30th last, makes very pleasant reading, and it affords us great satisfaction to be able to offer the Board most hearty congratulations on so excellent a showing. The Directors, it is true, could have exerted little effect in influencing the market price of copper, to which the increased profits are partly attributable, but they—with, of course, the loyal co-operation and assistance of a highly efficient mine and smelter staff—are directly responsible for the noteworthy economies in administration and production by which these costs have been reduced to the extraordinarily low figure of about \$3.04 per ton of ore mined—a record which two or three years ago would have been regarded as fringing on the impossible. Nor under the policy now being followed by the Company, do we believe the limit in this respect to have yet been reached, since smelting charges may yet be lowered, as a result of the further increase in the capacity of the works, which is now being made. We have referred to the general efficiency of the staff in British Columbia, but it is only fair in this connection to make special reference to the debt the company owes to the administrative abilities and technical skill which the general superintendent, Mr. A. B. W. Hodges, has displayed in the discharge of his duties. As we mentioned in a previous issue, the use of the automatic chargers in the smelter, a labor-saving device of great ingenuity invented by Mr. Hodges, represents a saving of many thousands of dollars a year, and this is but one instance of many of his very considerable capacity and devotion to the interests he serves. The output of the mines during the period reviewed has been maintained at practically the same level as in 1904, but the amount of copper, silver, and gold recovered appears to be less. This, however, does not imply that the values in the ore have decreased, but is explained on the grounds that no foreign matte was treated at the smelter. It is, in fact, interesting to note that at the average price at which the copper was marketed this year, namely, 14.36 cents, realized on a recovery of 2.41 per cent. Cu, a return of \$6.05 in this metal was realized alone. Meanwhile the company has materially increased its holdings by the purchase of several valuable adjoining properties in the Phoenix Camp, and has a cash surplus in hand of \$1,554,875.27. A few more showings like this and who shall have the temerity to question the mineral potentialities of British Columbia?

For many years Dr. Drummond has been systematically developing—with what successful results the world knows—a rich vein of poetry, which is among the gifts Nature has bestowed upon him. Having of late turned his attention to mining he is exploiting an equally rich vein of, however, a rather different character, in the Cobalt region. It is satisfactory to note from the following delightful lines, which we are permitted to publish, that in fol-

lowing the prosaic pursuit of the miner, the Doctor has not quite abandoned the pursuit of the Muse:—

BLOOM.

### A Song of Cobalt.

O! the blooming cheek of beauty, tho' it's full of many a peril,  
Where's the miner doesn't love it, for he thinks he knows the girl,  
While the bloomer, O! the bloomer! of emancipated She,  
May it bloom and promptly wither every seventh century.

O! the early bloom of blossom on the apple tree in June,  
Is there mortal having seen it, can forget the picture soon?  
And the wine of red October where Falernian juices flow,  
I have sipped the blooming beaker (in the ages long ago!)

O! the bloom along the hill-side shining bright among the trees,  
When the banners of the Autumn are flung out to every breeze,  
How it blazes—how it sparkles, and then shivers at a breath,  
What is it when all is spoken but the awful bloom of Death?

O! I've watched the roses' petals, and beheld the summer sun  
Dipping down behind Olympus when the great day's work was done,  
But to-day I'm weary, weary, and the bloom I long to see  
Is the bloom upon the Cobalt—that's the only bloom for me!

W. H. D.

Kerr Lake, Cobalt.

Some of the leading newspapers published in the Nelson and Slocan districts of British Columbia continue to criticise the work of the zinc commission. Thus the Kaslo *Kootenarian* remarks that having ascertained the opinion of local mining men, it is in a position to say that "the report of the zinc enquiry commission will be of no practical benefit to the industry and may result in positive injury. The advice of those who were most interested and are best capable of sound judgment was ignored by the permanent official—in the absence of the minister; the field examination has only skimmed over the country and the sampling of the larger deposits has become a farce; mine owners and claim owners have become indifferent to the work of the commission, its members are received politely but there in-



terest ends," while the Nelson *Daily News*, confirming these allegations, adds that no sampling, still less any adequate preparation for the separating tests promised, have been attempted.

It is further alleged that necessary data, which should constitute "a most important branch of the enquiry," is being sought by means of a circular letter to mine operators and others, "propounding a multitude of questions, many of which can only be properly answered by a technical expert when supplied with the necessary information which only the large operating companies possess;" and that it would appear impossible to complete, "even the casual examination now being conducted within the time set." On the other hand, the same newspaper contains an interview with Mr. Philip Argall, in which that gentleman is reported as having stated that the commissioners had practically completed the examination of zinciferous ore bodies of the Sandon and Slocan districts; that he was not sure, although he had at first held a different opinion, that it would be necessary to continue the enquiry beyond the time originally contemplated; and that he would "not be surprised" if the field work were practically completed before the approach of settled winter weather. Regarding the endeavour to secure information from persons interested in the investigation, by the sending out of circular letters, it may be remarked that this is no novel idea but a method adopted with excellent results under similar conditions by the United States Geological Survey. Of course, there may be real cause for grievance, apart from the fact that the Dominion Superintendent of Mines has refused to be governed by the recommendations or advice of certain mine owners, and if so, it is to be hoped they will be remedied. But surely, to attempt to discredit the work of the commission and attempt to discount the value of the report, before it has been made, is unwise and decidedly against the self-interests of those who hope most to benefit as a result of the enquiry. Both Mr. Ingalls and Mr. Argall are men of high professional standing, and it is unlikely that they will therefore subscribe to a report that is incomplete. In consequence, they should be relied on to suggest to the Government the advisability of extending the scope of the investigation should it appear to them that the present provisions are inadequate to admit of the subject being thoroughly dealt with.

### THE REVIVAL IN CANADIAN MINING.

The mining situation in Canada is at the present time a great deal more promising than it has ever been. In Nova Scotia the outlook for the iron and steel industry has considerably improved, as is evidenced by the recently issued report of one of the big undertakings, the Dominion Iron & Steel Co., which, although handicapped by a load of liabilities formerly incurred, is now earning very satisfactory profits. The condition of the coal trade in this province is also encouraging, and it is anticipated that

business this winter will be exceptionally good. In Quebec asbestos mining is very active in the Eastern Townships, it being estimated that the profits of three companies alone will be approximately three-quarters of a million dollars, while the new discoveries of gold, copper and asbestos in the Chibogamou region should, provided the mining laws of the province are amended to afford proper encouragement to prospecting and development, stimulate renewed endeavour along these lines and help revive interest in the mineral resources of what is undoubtedly a rich country. In Ontario a period of unprecedented mining development may be anticipated for the near future, as a result not only of the important new discoveries at Cobalt—and from information in our possession we are strongly inclined to the belief that this rich mineral belt will be found to extend beyond the limits of the present explored area—but in other mining sections of the province, notably the western gold fields, a noticeable change for the better has, during recent months, taken place, as regards the re-habilitation of concerns which had come to grief in consequence of former mismanagement and other disabilities incidental to stock jobbery or over capitalization, while, also, there appears to be an increasing disposition on the part of capitalists to invest money in the opening up of undeveloped properties. There can be no doubt that the promised revision of the mining laws, in accordance with the views and wishes of those chiefly concerned in the development of the mineral resources of the province, will be the one thing required to place the industry on a sound and substantial footing. The outlook in British Columbia is equally gratifying. Production is generally on the increase, so much so that the smelting works, we understand, are being taxed to their utmost limits, and arrangements are now being made for the re-operation of the long disused works at Pilot Bay, Kootenay Lake, as well as the smelter at Crofton on Vancouver Island. The most convincing proof, however, of improvement is the gradual increase in the number of profit-earning mines, and within the past few weeks dividends have been declared by the Le Roi No. 2 at Rossland, the Lucky Jim in the Slocan, the St. Eugene at Moyie and the Crow's Nest Pass Coal Company, while, during the month, the Granby Company has been able to announce most substantial profits on the past year's operations. In nearly every district new mines are being opened and the productive area is being steadily extended by the construction of railways into sections heretofore unprovided with adequate means of communication. Although the Yukon gold yield has of late years steadily diminished, by reason of the gradual working out of the rich creeks in the vicinity of Dawson, it is by no means unlikely that the prospecting now being systematically carried on in the territory will not fail to discover new gold areas. While, too, the inauguration of dredging; the preparations for working ground, not sufficiently remunerative to reward individual effort, but capable of yielding good returns if worked on a large scale; the step contem-



plated by the Federal Government of providing a system to afford miners a constant and ample supply of water for operating purposes; and last, but not least, the promising results attending the development of the copper mines in the White Horse district and of the new discoveries at Windy Arm may well be taken into consideration when the outlook is decidedly hopeful. On the whole, therefore, we can scarcely think that we are unjustified or over-optimistic in entertaining the belief that the mining industry in Canada is about to commence a new chapter in its history, which will be noteworthy as recording a period of remarkable prosperity and considerable expansion.

### SOME MORE LE ROI CIRCULARS.

The Le Roi controversy has already been waged *ad nauseam* and so far as the MINING REVIEW is concerned, we are anxious enough to drop the matter and allow the shareholders to form their own conclusions from the lengthy arguments with which they have been supplied by both parties to the dispute. However, for the sake of record, it may be noted that Mr. McMillan has issued another circular, in which certainly he makes out a very plausible case. He claims first, that his strong opposition to the amalgamation scheme is purely disinterested, as it would have been to his direct and immediate personal benefit to have endorsed the plan, since various inducements were held out for him to do so. He next contends that if the directors had followed the advice of Mr. J. H. Mackenzie, in April, 1904, by August the Company would have owed the Bank of Montreal between thirty thousand and forty thousand pounds in excess of the liquid assets. His other points are that the technical officials of the Le Roi Company agree with him in opposing the scheme, and that they were not consulted at all in the matter; that although the directors now express themselves dissatisfied with his management of the mine, that up to the time he left Rossland for England, two months ago, no complaint was made; that he has been kept in the dark concerning negotiations that have been in progress; and he regards as peculiar the fact that both Mr. Waterlow and Mr. Rolt, whose interests in the Company appear to be very small, should now disclose such anxiety for the scheme to go through. He condemns as a half truth the directors' statement that Mr. Mackenzie resigned last year because he disapproved of keeping the Northport smelter open, since Mr. Mackenzie was only temporarily employed, and in his letter to the Company recommended that the smelter be closed until there was sufficient ore to keep at least "four furnaces in operation, as economical smelting was impossible with only two furnaces running." Mr. McMillan states that since that time, important changes have been made at Northport, and cheaper smelting was done last year with two furnaces than was formerly effected by the operation of four furnaces. And he concludes a clever argument by express-

ing his willingness to recommend the payment of a dividend, for the year ending June 30, 1905, adding: "You will, no doubt, be told that if you consent to reduce your capital, you will, to quote from the Directors' Circular, have regular dividends in the future. This is a matter of opinion, and many competent observers in the West think otherwise. Let me remark here that if considered desirable the capital of Le Roi could be reduced without taking in these outside companies." The directors, in reply, point out that the professional officers referred to by Mr. McMillan, as joining with him in opposing the proposed amalgamation of the Le Roi, were Mr. Astley, an appointee of Mr. McMillan, who has all along been more or less in an infirm condition of health, and was thus unable to accompany Professor Brock in his examination of the mine; and the foreman, Trevorrow, who, "as Mr. McMillan is not himself a mining engineer," thus became the chief mining officer in the Company's service. It is further stated that Mr. Mackenzie, who has always been in favor of amalgamation with other mines, endorses the proposed arrangement, "If," as he points out in a letter addressed to the Board, and dated September 22nd last, "you receive your just proportion of the new consolidated company." This proportion, it is stated, will be left to Messrs. Bradley and Mackenzie to arrange. Mr. Mackenzie also states in the same letter regarding the Trail smelter contract, that, while exact figures have not yet been compared, "the present contract will save the Le Roi Company about seventy-five cents per ton, over and above the cost of shipping to Northport during the present year"; in other words, if Mr. Aldridge's offer had been accepted in August, 1904, the Company would have been saved in the meantime about eighty thousand dollars.

Relative to Mr. McMillan's attitude concerning the matter of a dividend, the directors regard that such a dividend could only be paid by the Company by borrowing the amount from the bankers upon the security of the floating assets. Furthermore, that it would be to the interest of the directors to recommend a distribution of profits, since under the Company's Articles of Association, they, with the exception of the Managing Director, receive no fees for their services, but are entitled with him to five per cent. of the amount of any dividend that may be paid. We have no wish to introduce the personal element; but as the public will find it difficult to discriminate in an argument which deals essentially with technical questions, the alternative suggests itself of considering whether greater credence should not be given to the opinion of disinterested experts, such as Professor Brock and Mr. Mackenzie, than to the views of a less well-known engineer, such as Mr. Astley, or to those of a mine foreman, however clever a practical workman he may be. It seems that the directors have very prudently preferred to listen to the advice of the bigger men, while Mr. McMillan supports his contentions by quoting the opinions of, in sporting parlance, the "light weights."



## OIL IN THE WEST.

It would be a remarkable thing if the deposits of mineral oil, whose development has been of such importance to Kansas, Texas and California, had not their counterpart in the Western provinces of Canada. But it is one thing to presume the existence of petroleum and quite another thing to locate it in commercial quantities. After all, it is not so long since the production of crude oil anywhere in commercial quantities, except from the distillation of shale, was accomplished. There are plenty of men alive to-day, who can go back to the time when oil was skimmed from the seepages in Pennsylvania, and peddled as a lubricant and for medicinal purposes. If the discovery and utilization of petroleum has spread over the United States with extraordinary rapidity, there is still time for a similar development in Western Canada, when once a point has been discovered producing oil in paying quantities, where it can be readily marketed.

Petroleum was apparently first collected and used in Burmah on the banks of the Irrawaddy. Wells have been discovered there of great antiquity. They were dug by hand and the oil collected in vessels and hauled to the top. Of what the mortality from gas fumes must have been, there is no record, but as the oil business was a royal monopoly and the operators probably slaves, a high rate of mortality would not count. When this oil region was opened up under British rule no pressure of oil was got upon the sites of these old wells, but at a higher altitude in the same neighborhood. So that they were in all likelihood simply developed seepages, the oil having first been forced up through fissures, and having then spread down to lower levels through the surface soil.

The first recorded experience of Europeans with petroleum was in the time of Alexander the Great, some three centuries before Christ. We are told that in the district of Ecbatana, Alexander greatly admired a "gulf of fire which streamed continually as from an inexhaustible source, also a flood of naphtha not far from the gulf which flowed in such abundance that it formed a lake." He amused himself by sprinkling it over the ground and watching the fire spread without consuming anything. It occurred one day to one of his courtiers that it would be an excellent idea to anoint a human body with the naphtha and set fire to it. This interesting experiment was tried on a boy who submitted to it joyfully. The consequences were disastrous to the boy. The historian relates that he was an ugly boy but a good singer. What he looked like or how he sang afterwards he does not mention. But he does say that it was lucky the business took place in a bath where there was plenty of water. "As it was," he winds up, "they found it difficult to extinguish the fire, and the poor boy felt the bad effects of it as long as he lived." "Such digressions as these," as our ancient chronicler himself remarks, "the nicest readers may endure, provided they are not too long."

In Western Canada oil was first collected at what is known as the Aldredge seepage. Aldredge had a system of sluice boxes with riffles made of gunny sacks or woollen material and by this means used to collect some oil which he sold for axle grease and other purposes. The seepage is located on Cameron Falls Creek, in South-Eastern Alberta, a few miles from the British Columbia boundary line. The seepage is described as follows by Dr. Selwyn, who visited it in 1891:

"Cameron Falls Brook is a rapid mountain stream eight or ten yards wide. After following it up about a mile and a half on the left bank, Mr. Fernie, my guide, remarked that we must be close to where the oil had been found. He had scarcely spoken when, while still in the saddle and on the trail eight or nine feet above the brook, I noticed a powerful odor of petroleum. Descending to the edge of the water and stirring the stones and gravel in the bed of the stream, considerable quantities of oil at once rose to the surface and floated away. Crossing to the right bank it was again seen coming out of the bank some inches above the then level of the stream. Here, skimming it off the surface of a shallow pool, a wine bottle full was soon collected. This can now be seen in the Geological Survey Museum. Sixty or seventy yards below where the oil was seen, a rocky reef of grey siliceous dolomite crosses the creek and rises into a steep bluff on the left bank; on the right bank, seven or eight feet above the creek, a broad, thickly timbered flat extends for 150 yards to the base of the bordering mountains which culminate six miles to the south west at the boundary monument 6,000 feet above sea level."

The Rocky Mountain Development Co. and the Western Oil & Fuel Company, are now boring in this neighborhood.

On the British Columbia side of the range there are numerous and certainly very remarkable seepages of petroleum. The Flathead Valley Oil Lands Development Co. and the Dalles Oil Company of Portland, Oregon, are operating on the B. C. side. A good deal of the land in the Flathead Valley is tied up in one of those interminable and inextricable legal tangles in which British Columbia takes delight.

It might naturally be expected that definite developments would be obtained in this neighborhood first, and encouraging results are reported to have accompanied the small amount of boring that has been done. There are five organized companies operating in this district, two with headquarters in Victoria, B.C., one in Portland, Oregon, one in Vancouver, and one in Calgary. Practically no eastern capital, however, is interested, and all the companies are more or less hampered by shortness of funds.

Still another company is being organized in Vancouver to bore for oil in Cariboo where oil shale has long been known to exist in great quantities, but where seepages of petroleum have lately been discovered.

There is another company boring for oil near Edmonton, and a group of Winnipeg men have secured some territory in Athabasca where some work was previously done by the Dominion Government.

Thus it may be seen that interest in the petroleum resources of Western Canada is gradually extending. Some day the hit will undoubtedly be made, where, when, or how, has not yet definitely emerged. But when the time and occasion do arrive the growth of production and of the capital value of these resources may be expected to be both great and rapid.

### THE PROPOSED REVISION OF THE ONTARIO MINING LAW.

While we are not prepared to admit that the policy of the Ontario Government in respect to the administration of the mining affairs of the province is invariably sound or far-seeing, it is but common justice to credit not only the present administration but its predecessors in office with a keen desire to promote the best interests of the industry; and, in certain directions, more has been done in Ontario to aid and encourage legitimate endeavour than, perhaps, in any other province or territory in Canada. This very attitude, however commendable in itself, has in some instances produced results that were neither contemplated nor desired; and, we are, we think, not unjustified in attributing the present by no means flourishing condition of the industry in general, the lack of systematic prospecting effort, and the scanty developments, to a policy that has been a curious combination of generosity untempered by prudence, and a paternalism governed by selfish interest. Men who have made a life study and a business of mining have time and again during recent years pointed out the defects of this system, but the deficiencies were never really strongly brought home to a public, heretofore largely apathetic or sceptical, until the extraordinary richness of the new discoveries at Cobalt, and the rush to locate claims in that district called attention to the deplorable inadequacy of the mining law and of provisions at once irksome and arbitrary. That this had not been so apparent in the past is attributable to the fact that little, if any, previous attempt had been made to apply the law as it stands or insist on a rigid adherence to its requirements from those who were supposed to be governed by it, with the none-the-less deplorable consequence that thousands of acres of mineral lands in Ontario are held by speculators who neither develop the properties themselves nor by the prohibitive prices they demand, allow others to do so. It was unquestionably in the legitimate desire to prevent a repetition of this condition of affairs in Cobalt, that the Ontario Government decided on exercising its prerogative of passing Orders-in-Council to cope with the situation, in the particularly drastic and arbitrary fashion which we have felt it our duty to criticise in these columns. But a law that can be, at one and the same time, either too lenient or too stringent, is a bad law. Also

a law that places in the hands of a few men autocratic powers which are easily liable to be abused, is not a desirable law; and no mining country, however rich, can permanently prosper under conditions of a law that is not favorable to its development. Our attitude meanwhile in respect to the policy of the Ontario Government as affecting the Cobalt district has not been clearly understood in some quarters. It has been construed as an attack on the provincial administration and as a slur on the integrity and capacity of the officials whose duty it has been to carry out their instructions. We are at a loss to understand how such an impression could have gone abroad, more especially as the MINING REVIEW has, we are proud to assert, earned in the twenty-three years of its existence, a well established reputation for disinterestedness, which it is not proposed to jeopardise. It should hardly then be necessary to assert that our attack is not aimed at either the Government, Legislative Council or the Inspectors, whose honesty of purpose is neither questioned nor impugned for a moment. The Government has acted under a clear sense of duty, in accordance with the authority that the Act affords; the Inspectors have acted under instructions, and have performed their task in the thorough manner which was to be expected of them. But that is not the point which we have been desirous of emphasizing. It is not a question as to whether the Ontario authorities have or have not exceeded their constitutional right in the administration of the Mines Act in this section; that is purely a side issue; but the crux of the matter is the fundamental unsoundness of a law which is not direct in its operations and whose whole sense may be perverted at the discretion of individuals vested with autocratic authority.

It is, however, but common justice to point out that, following the acceptance of office by Mr. Cochran, as Minister of Lands and Mines, the Government were brought to realize the futility of the present Mines Act, and no more politic step could have been decided upon than that which has been adopted to ascertain the views of the mining communities regarding the necessity for, and the direction of, the proposed reform. Comparisons are proverbially odious, but one can hardly refrain from contrasting this wise and broad-minded attitude with that of other provincial governments in Canada, where, at any rate in the case of British Columbia, concerted action on the part of men engaged in developing the mineral resources has been discouraged, and recommendations made by representative organizations contemptuously ignored. Already, we understand, meetings are being held in the important mining centres of Ontario to discuss the revision of the law, while in a few weeks a general convention representing the several mining and metallurgical interests will assemble in the capital of the province to offer a final expression of opinion on the subject. In view of this it may not be out of place to discuss some of the points that appear to us to be of paramount importance in the framing of a law that, while aiming to be



generous and thus encourage both exploration and investment, still in every way possible shall render the acquisition and tying up of large areas of potential value by speculators, a matter of extraordinary difficulty. In framing such a law, it is well first to bear in mind the fact that for the development of our mineral resources in Canada we are very largely indebted to, and are still dependent on, American energy and capital. This is especially true in the case of British Columbia, and the conditions in Ontario are not dissimilar. For many years we must continue to look to the United States for considerable assistance in this regard, and consequently it is essential that our law should at least not compare unfavorably, in the sense of affording protection and encouragement to the miner, with the law which has contributed so much to the great mineral and industrial developments in Montana, Colorado and other mining States of the Union. In the United States, we believe we are correct in stating, the principle recognized is that an adequate expenditure of time and money in the development of a property is a sufficient evidence of bona-fide intention, and so this is the condition invariably insisted upon before title can be secured. Stringent provisions on these lines, rigidly enforced, in the Ontario Act, would strike at the root of some of the worst evils under the old system. It has been urged that in such an exceptional case as Cobalt, a working condition would prove ineffectual in checking the speculative acquisition of ground, as, owing to the high speculative value of even barren land in this rich area, many men would willingly enough undertake to carry on a sufficient amount of work to qualify them to hold such claims with the prospect of selling them again at considerable profits to fraudulent promoters or schemers. But in addition to the fact that, according to a well known axiom, it is impossible to make men moral by Act of Parliament, this argument is obviously weak since it is clear that it is to the interest of the locator of a claim to prove actual value when he can, and it should be left to him and not (as has been the case) to a Government official to declare whether or not the value is there. The latter course, as we have already maintained, not only savours of gross paternalism, but it leaves the door open for all manner of abuse and injustice.

Another point, which we trust will be discussed at the forthcoming convention, is the necessity for an uniform mining law applicable to the whole province; and a law so simple, concise and clear as to leave no excuse for misinterpretation. Prospectors are in general an intelligent class of men; but it is asking rather much to require that they should obey regulations that are enforced in one locality and not in another, and in addition become subscribers to the official Gazette that they may keep themselves informed as to whether or not the Lieutenant-Governor-in-Council has seen fit to spring on them some new Order. The miners' license or certificate, moreover, should give holders the right to explore for mineral in any section of

the province and not, as now, restrict him to a circumscribed area.

The cry in Ontario is that the public has derived little direct benefit from the mining industry; that the miner asks much and gives in return practically nothing. There is, perhaps, some truth in the contention, but the public and not the industry is to blame. Frame a good mining law, impose conditions that will encourage development and not retard it, and the indications are such to-day, as to promise that the industry will in the next few years, be in a position to contribute appreciably to the revenue of the province. But no cow will give much cream if you first feed her with unwholesome food and then purge her with non-curative drugs. We are informed, meanwhile, that the Government is determined that the industry shall at least contribute sufficiently to the revenue to defray the costs of administering the Mines Department, and also provide a fund to assist toward the expense of opening up new districts by roads and trails, and it is proposed therefore to levy some form of taxation on producing properties, either in the guise of royalties or otherwise. In the present state of the industry it will be easy to make a false step here, and we trust, therefore, that the matter will be approached with the greatest circumspection and only finally dealt with after the most full and careful consideration. There are, of course, several ways in which even now the industry may be made to bear its fair share of taxation without imposing undue hardships on mine-operators; and, while this interesting subject is worthy itself of a special article, we may here suggest one means by which this may be brought about and at the same time go far towards remedying an evil resulting out of the old order. In a paper entitled "Suggested Improvements to the Mining Law in Canada," read by Mr. Eugene Coste at the Toronto meeting of the Canadian Mining Institute, in March, 1904, the author makes the statement that "in the years 1897-1902, (inclusive) the reports of the Bureau of Mines of Ontario gave, as having been granted by a full purchase or lease, . . . . 3,922 locations of a total acreage of 411,190 acres," while in the year 1903 only about 100 mines approximating 4,000 acres were being worked. Last year's report of the Bureau shows a further increase in sales and leases made by the Government, the sales amounting to 6,437 acres and the leases to 33,427 acres; and we are unable to find that there was any great corresponding increase in actual mining activity. If these inoperative lands, held for presumably speculation purposes only, can be turned to profitable account in providing the Government with the necessary funds to assist legitimate industry, it will be a step very far in the right direction. The manner in which this can be done is very simple, for it would merely mean the imposition of a heavy tax on unworked lands, which, if unpaid, would enable the Crown to seize the property and either throw it open to re-location or offer it for sale under similar conditions. In any event the province must of necessity benefit from such a measure.



## ASBESTOS MINING IN QUEBEC.

(No. 2.)

THE STANDARD ASBESTOS CO., LIMITED.

The Standard Asbestos Company owns one of the largest asbestos properties in the Black Lake

in the different localities varies in hardness, so that at one mine No. 1 and No. 2 grade is extracted by hand, in another only No. 1 grade, while others again do no hand cobbing, the entire output of the mine being treated in the mill. In some mills two qualities of material are produced, while in others



The Standard Company's Milling Plant.

district, having taken over, some years back, the 325 acres or so, formerly owned by the Anglo-Canadian Asbestos Company, Ltd., by whom operations were carried on from 1890 to 1895, during which time several thousand tons of crude material were extracted. Two years ago, however, an extensive

there are as many as four or five grades. In the monograph recently prepared by Mr. Fritz Cirkel for the Mines Branch of the Department of the Interior, contains an interesting account of the mills in use at Thetford and Black Lake. In brief the process is as follows:—



A General View of the Property.

milling plant was erected to prepare the asbestos fibre in the form now required by the trade. The mills in this district practically apply the same system for fiberizing of the material, but none of them are exactly similar in construction. The serpentine

**First Part of Separation.**—All the asbestos rock and fines produced at the mine goes first through a Blake crusher; then, through a rotary dryer, and is raised by means of a bucket elevator, to the third story of the mill building. It passes then through a



rotary crusher, into a big cylindrical fiberizing machine. The material is then raised by a bucket elevator and falls on a shaking screen, with 1-16 inch

charge of which is placed with the shaking screen, in an air-tight chamber. An exhaust fan, connected with the latter and leading to the open, creates a



View of Pit No. 1.

holes. All the loose fibre is here taken up by a fan, and is deposited in a collector. The sand from the shaking screens, falls into a hopper, where it is

suction in the cyclone, thereby facilitates its discharge and, at the same time, takes up all the dust emanating from the shaking screen. All the fibre



Another of the Company's Quarries.

loaded into cars and sent to the dump. All the remaining rock and fibre from the shaking screen falls through a chute into the cyclone apparatus, the dis-

separated in the cyclone and going over shaking screen falls into a hopper and is loaded into dumping cars.



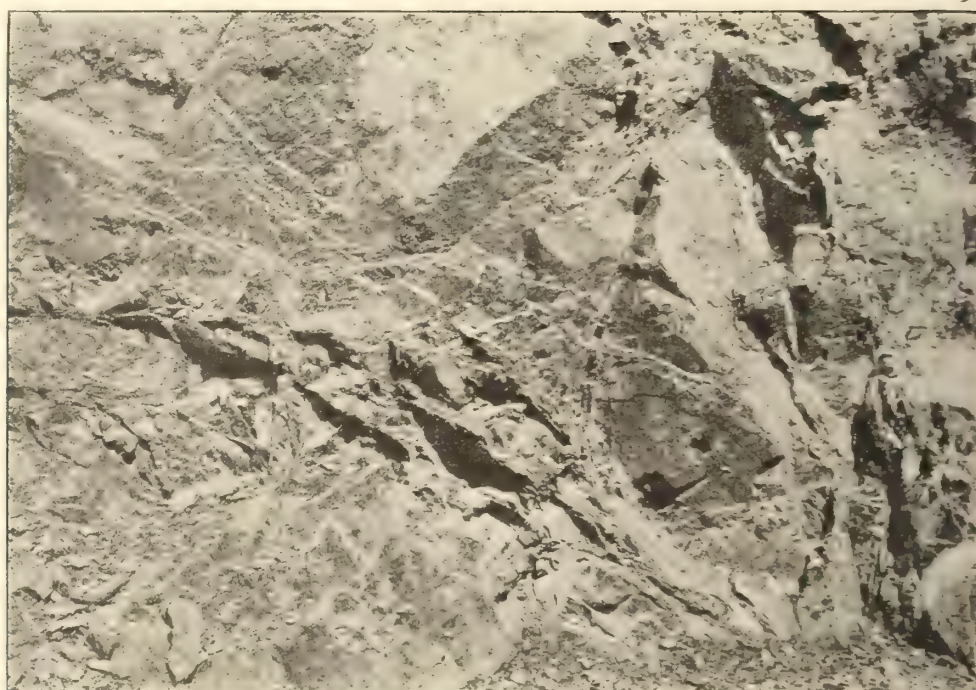
Second Part of Separation.—All the fibre extracted from the rock is now placed in collector I, from here it passes through revolving and grading screen, with arms moving in opposite direction. In this screen two grades are made, the quality of which is regulated by means of a grading board turning on hinges. In order to eliminate the sand, both No. 1 and No. 2 grades are passed over screens.

Two suction fans take up the fibre and place the same in the collectors, the first quality in No. II and the second in No. III collector. The tailings of the shaking screens pass again over another screen, where all the longer fibre still in the sand residue is taken up by a fan and deposited in collector III, which now contains the marketable article known as paper stock. No. I fibre deposited in

of the crude material has been obtained. In the western extension of the first pit a number of veins yielding a first class milling material have been developed by openings and cross cuts. These veins intersect the rock in every direction and range in points from one-quarter to one and two inches. About sixty per cent. of all the rock mined is sent to the mill, the extraction of fibre from the milling rock being as high as ten and twelve per cent.

The main pit is equipped with two inclined cable derricks and two boom derricks, three air drills, one double and two single drum hoists.

Air for the drills is supplied by a five-drill air compressor. The mill is in close proximity to the mine and the derricks dump the ore close to the ore bins. A section through the mill is given in Fig. 26



View showing Distribution of Asbestos Veins in one of the Standard Company's Pits.

collector II is further cleaned on a shaking screen and is then ready for the market.

All the tailings resulting from the screenings fall into a hopper and are ground in a horizontal emery mill for the manufacture of asbestos finishing plaster.

Meanwhile, at the Standard Asbestos Company's property large exploratory and development operations have been carried on to prove the extent of the asbestos-bearing formation, with results that have been highly satisfactory. At the present time work is being chiefly confined to the development in the serpentine at the northern extremity of the property, where several pits have been opened. The main quarry has a length of 120 feet, a width of 70 feet and a depth of 40 feet, and connection is made with another large adjoining quarry, where the bulk

and a description of the same on pages 64, 65, 66 and 67. The boiler plant consists of three horizontal boilers with a total capacity of 240 horse power. A 150 horse power side valve engine drives the mill and dryer, while the first Blake crusher between ore bin and dryer is driven by an extra 25 horse power high speed engine, the works are all lighted by electricity furnished by a 150 light dynamo.

Mr. Cirkel states that this company, with its extensive asbestos-bearing area should be able to contribute largely to the output from Black Lake, especially when it is considered that the work so far conducted has exposed a great number of places from which to draw ore, while the capacity of the mill, which is at present only 150 tons per day, can easily be doubled with a few additions to the present machinery.



## OCCURRENCE OF HEMATITE NORTH OF LITTLE CURRENT, GEORGIAN BAY.\*

By S. Dillon-Mills, Toronto, Ont.

Late in last summer I was commissioned to examine and report on a supposed gold property in the above district. The result of the examination was unfavorable; though at first sight the place looked as if there might be something of value in it, careful examination, assisted by numerous analyses of samples taken from different points, showed such low gold value as to oblige me to condemn the proposition.

The small amount of work done in securing the samples for gold estimation served, however, to indicate that the property, though valueless as a gold proposition, might be worth developing as an iron prospect. The Ontario Bureau of Mines Reports 1901 (Report of Iron Ranges of the Lower Huronian, by Dr. A. P. Coleman), contains the following statement: "The wide band of Huronian between the 'Soo' and Sudbury is not known to contain any rocks of the iron formation, though the large numbers of bright red jasper pebbles in the conglomerates of the Upper Huronian must have a source somewhere in the region." (P. 201.) I had therefore the pleasure of proving the correctness of Dr. Coleman's deduction, as will be seen later on, by locating this source of the jasper pebbles, and, further, have the hope that we may yet find ore in workable quantity in this practically untried locality. I feel, however, the great necessity for caution in the matter, as the district has been thoroughly explored in search for gold many years ago without any large deposits of iron being noticed, so that it looks as if we would have to go to some depth to find them. I therefore contented myself with stating to the parties interested in the matter, the facts so far known to me then, and advising some further exploratory work before abandoning the property. My suggestions were adopted with results as follows.

I have appended to this paper a rough sketch map, not strictly accurate, but sufficiently so for the purpose of reference. The greater part of the ground, even on the rocky hills, being covered with dense, low second-growth trees, birch, poplar, spruce, etc., except where the rock showed in scattered patches, rendered sighting from one place to another, or the taking of compass bearings, in most cases impossible, and some slight attractions enhanced the difficulty, by causing the different readings to contradict each other. Those of the members who have tried making sketch maps of our Huronian hills will appreciate the difficulty.

By referring to the map, you will see that the topographical features are as follows. Commencing at the south, we have first a rocky ridge, probably thirty chains or over in width, extending south beyond the limit of the map; then a swamp with a thick growth of alders, etc., about 300 feet below the highest point of the ridge; then, northward, an

isolated rocky butte, much of it covered with drift material, boulders and loam; then cleared land, and then another ridge apparently consisting of boulders, gravel and loam, at the west end, but becoming more rocky towards the east. If we turn now south-east from the narrow part of this latter ridge, we descend an almost precipitous rocky face, cross a narrow valley or gorge covered with broken rock, ascend a similar rocky face, cross a narrow ridge, and descend again to a wider valley, dry and gravelly with some loam, and arrive at the foot of an almost perpendicular cliff at G. This ridge G is partly separated from the first south ridge by a depression running about southeast between them, but keeping probably 100 feet above the level of the other valley, a set of finger-like promontories extend from the south ridge easterly into it.

Turning to the geological features, we find the most interesting in a belt of jasper of irregular width, varying probably from fifty to over one hundred feet. It is of various colors, red, brown, green and white, much fractured, and showing more than one period of disturbance, the older fractures being re-cemented by infiltrated quartz, mostly white, while the more recent are stained or filled with soft red hematite, and have left the rock in such a condition that it is very difficult to drill for blasting, yet possible to work out with a pick. The strike of this belt is about E. N. E., the dip is doubtful, but appears to be perpendicular with a slight southerly inclination in places; there is no trace of bedding, and its banded structure looks as if due to flow under pressure; on the whole, it bears a resemblance to an intrusive dike, forming as it does the north-west scarp of the heavy ridge, just as we shall find the greenstone dikes forming the face of other ridges later on. The northern edge of the jasper belt is concealed by the debris along the edge of the swamp. The southern limit, which is on the first step of the ridge, is also mostly concealed, but in a couple of places is seen in contact with the felspathic quartzite, which forms the body of the ridge. This quartzite passes in places into an arkose, and in others becomes somewhat schistose, it is distinctly bedded and strikes about parallel to the course of the jasper, the dip varying in places from about 75° N. N. W. to perpendicular or even 85° S. S. E., as nearly as can be seen by the exposed faces at the surface. It varies in texture from coarsely granular; to almost vitreous, with conchoidal fracture. This belt of mixed quartzite and arkose is traversed in a direction about 20° N. of E. by what appears to be a continuous dike of greenstone, showing in separate exposures approximately in line; some of these outcroppings show a width of not more than fifteen feet, in others the width is much greater, but either one or both contacts are concealed by debris (owing to the small scale of the map it was necessary to exaggerate these outcrops, the intention is merely to show their mode of occurrence).

To the westward this line of outcropping runs into what is either a set of short dikes running in directions varying from about east to northeast, or else the outcropping of one heavy dike striking

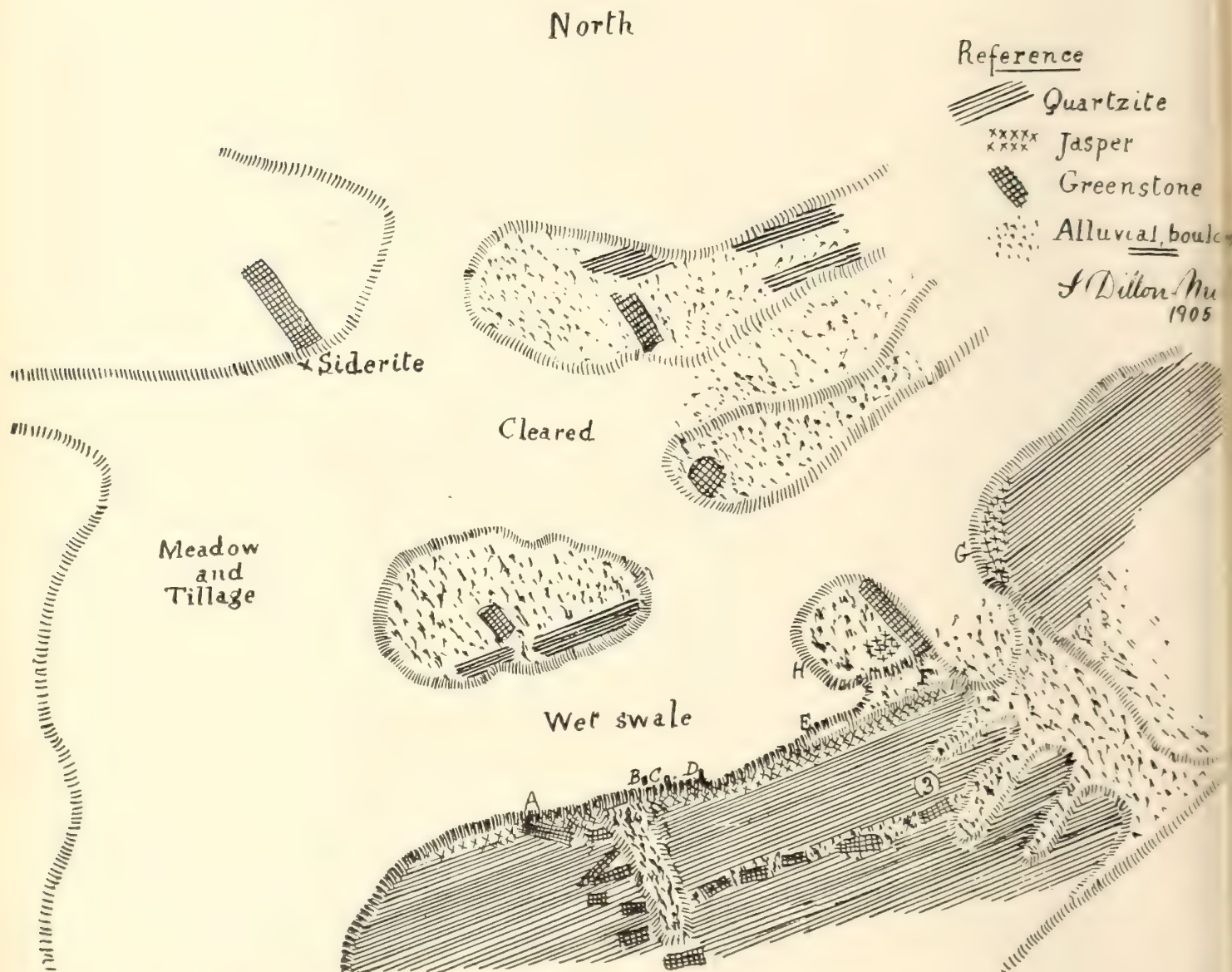
\*Trans. C. M. I., March, 1905.



about S. S. E. across the course of the first one, in which case it cuts the belt of jasper below the present surface, which may account for the different appearance of the rock at this point, which is here a specular iron jaspilite. The appearance of this set of dikes is very peculiar, the outcrops are only to be seen on rounded knolls or the edges of the successive steps which are met, as one, going south, climbs the flank of the main ridge. In one place, two short dikes come together in V-shape, enclosing a wedge of quartzite, which at the point is much altered by

dike, which have been forced up through, or rather along, the bedding planes of the quartzite; the close texture of the greenstone also lends color to this view of the case.

At a distance of about thirty-two chains north-east from this another dike shows on the east flank of the knoll, it runs about  $55^{\circ}$  W. of N. across the bedding of the quartzite, cuts through the jasper of another belt, and approaches the first belt, but does not seem to cut into it. The eastern side of this knoll formed by the greenstone is in most places



the contact effect; while the other end, where both the dikes and the quartzite are cut off by a precipitous drop to a ravine, shows a width of thirty feet about of the ordinary quartzite, unaltered, except at the contact edges. Neither these two nor the other short dikes can be traced further east than this ravine, the bottom being covered with masses of rock and some loam, and beyond it they do not reappear. To the westward they run out apparently to nothing in a short distance, so that at present I am disposed to look on them as a set of protrusions from a main

precipitous, and the jasper cannot be positively traced beyond it, as there has evidently been considerable disturbance along the line of the depression to the southeast, and the jasper marked on the edge of the cliff (G) eastward of the low ground probably belongs to the south belt. The western side of the knoll slopes gently to a low swale, and is covered almost to the summit with loam and drift material, consequently I was unable to trace this jasper outcrop any further, and at first supposed that it marked the north boundary of the first belt,



which would thus have a width of over 300 feet at the least, but this proved not to be the case, as will be shown later on.

The rest of the neighborhood shows chiefly quartzite, etc., similar to that already noted, and in many places dikes of greenstone, some of which come barely to the surface; in one case where I put in a shot in a quartz-vein, I found the greenstone beneath the quartz capping.

About three-quarters of a mile northeast from the jasper belt there is a heavy greenstone dike carrying a small vein of pyrrhotite with some chalcopyrite, and just southwest of it a pit has been sunk about thirty-five feet on a seam of talc, which, however, proved worthless, owing to the quantity of quartz mixed with it. The pit was full of water at the time of my visit, but on examining the dump I was much pleased to find that a large proportion consisted of spathic iron, a matter of much interest in this case, as it indicated the possible existence of this mineral at a former period in large quantities, the decomposition of which would have furnished the material for the deposits of iron of which we were now in search. It is also interesting as furnishing another point or resemblance to the Penokee and other iron ranges of Wisconsin and Michigan, to which the dikes of the feldspathic quartzite and jasper existing here evidently correspond in many points. The following difference must however be noted, namely: In the Penokee range, especially, the feldspathic quartzite-slate member is non-ferriferous, in fact it forms the impervious bed by which the iron deposits retained, in some cases being carried down along it till they strike a dike of greenstone cutting through the quartzites and forming a trough in which the ore is deposited. This feature is ably demonstrated by Van Hise and others in the U. S. Geological Survey reports. Here, on the contrary, the quartzites are often highly ferriferous, carrying iron both as oxides and sulphide, and are so shattered as to afford easy passage to atmospheric waters. When sampling some quartz veins which cut through the quartzites at a spot fully 300 feet from the jasper belt, I found that after the surface had been removed the rock was stained with hematite in all the joints, (these joints in many cases showed the effects of attrition produced by movement). At the depth of four and a half to five feet below the surface the rock seemed less solid than on top, and the mud from the drills looked almost pure hematite, so that judging from the general appearance I would not be surprised if the rock gradually became more decomposed further down, and perhaps, ultimately gave place to a deposit of hematite extending under both jasper and the quartzites.

When starting to examine the place for hematite, I commenced by digging in the swale, at the point indicated by the letter B, thinking I was in line with the jasper at H, but struck boulders and stiff clay and soon cut into a strong spring of water which drove the men out of the pit, I then moved them to a spot (D) on the steep slope of the ridge near its base. Here the indications of hematite

showed very strongly. I had a trench cut down to swamp level, and ran it to the face of the jasper rock, which here rose to a height of about thirty-feet perpendicularly. Just about the level of the swamp we struck a decomposed feldspathic quartzite in direct contact with the jasper about six feet from the face of the cliff; we proceeded then to sink a pit in the trench next this face, going down on the jasper which here showed seams of soft clay and hematite, and next the quartzite a thin seam like decomposed soapstone. We got down about five feet on this, the indications improving rapidly, the jasper becoming more shaky and decomposed, and the seams of hematite clay increasing in width, and going down perpendicularly with the rock. We were now down ten feet below the surface, and could not do more without timbering and providing means of hoisting, which was beyond the limit of my instructions for the work. I was therefore obliged reluctantly to quit this point.

Arkose or quartzite rock was afterwards traced at three other points (marked (C, E and F), in the same position relative to the jasper, thus showing that there are two belts of jasper separated by it from each other. This explains our failure to find any iron indications in the first pit, and the centre of the swale where the probable continuation of the second belt is, being under water, we could do nothing further in the way of tracing it.

In view of these facts, I recommended the sinking of the prospecting pit to a further depth of twenty-five feet, and if results are still encouraging to employ the Government diamond drill to further test the ground and if possible locate the ore body. At the time I promised to give this paper, I hoped to have these additional tests completed before the time arrived for its delivery, but some difficulty respecting the title to the property prevented this, so nothing more has been done. I decided to give the paper, incomplete as it now is, on account of the geological interest attaching to the corroboration of Dr. Coleman's forecast respecting the jasper belt. Another reason for introducing the subject in its present unfinished condition is that now is the time when it furnishes the best illustration of the uncertainty, interest and mystery which surround an untried field. After a matter of this kind has been proved and developed, it becomes impossible by an effort of memory to place oneself back again amidst the uncertainties which have been left behind; we unconsciously assume to some extent the attitude of having known all about it, good or bad, long before; forget that there ever was any uncertainty, and are like the artist trying to recall the tints of sunrise under the heat and glare of noon. First impressions, unless at once noted, can never after be accurately recalled, or the bygone conditions seen in their former aspect.

To the younger student members, it may also be of interest in calling attention to the necessity of a careful consideration of geological facts and a guarded conservative use of the imagination as one finds it necessary to picture what may be the condition of things beneath the surface.



We have here shattered jasper, quartzite, and arkose, the permeability of which is calculated to render possible the carrying down, by the atmospheric water of the dissolved pre-existent iron carbonate. We have also dikes of greenstone, which may at certain unknown depths, either by themselves or in conjunction with other formations, make impervious basins which serve to retain the iron precipitated as peroxide from the solution. At these depths, the water charged with carbonic acid may be expected to have a more or less solvent action on jasper and quartzite, so that cavities would be formed and refilled with hematites. Most of these things are pretty certain to have taken place, but uncertainty still attaches to two important matters. First: Have the dikes formed the requisite trough or

ply as he has also acquired a number of zinc properties which are being developed. The plant, of course, is to be over-hauled and additional machinery installed to provide for efficient working.

A brief description of these works, which have not been in use for a great number of years, appears in the Minister of Mines' Report, 1895, from information supplied by one of the owners, Mr. A. B. Hendryx, as follows:—"The company's work for sampling, concentrating, roasting or calcining, and smelting, are located upon the East side of the Kootenay Lake, ten miles southerly from the peninsula, and directly opposite the Kootenay Lake outlet, through which all incoming waters to the Kootenay Lake discharge. The outlet is the water communication between the works and Nelson, a dis-



The Smelter at Pilot Bay, B.C., formerly owned by the Kootenay Mining and Smelting Co.

catchment basin below? Second: Is that basin at such depth and of such capacity as to make the mining of the ore a financial success?

The diamond drill offers the cheapest means of answering these questions approximately.

#### REPORTED RESUMPTION OF OPERATIONS AT THE PILOT BAY SMELTER, B.C.

It is reported that Mr. Fernau, on behalf of the Canadian Metals Company, recently purchased the Pilot Bay Smelter, which is to be operated as part of the company's plans to bid for the treatment of the Kootenay zinc ores. Mr. Fernau is, however, not entirely dependent on outside sources of sup-

pliance of about twenty miles. The works are so located as to command two great harbours, the neck of land between them being only a few hundred feet wide, being also midway between the north and south ends of Kootenay Lake. The machinery in the various departments is of the latest and most improved type, as shown by the results during the brief period the works have been completed and working, and consist of an automatic sampling works, capable of sampling 250 to 300 tons of ore per diem; a roasting department, consisting of five roasting or calcining furnaces; one 100-ton water-jacket furnace. The concentrating works, blower for smelting stack, and electric plant are each run by a separate engine. The machine shop is completely equipped with lathe, planers, compound drilling machine, bolt and pipe cutting ma-



chines, together with blacksmith and carpenter shops all supplied with up-to-date machinery.

"The works were complete enough to commence the treatment of ores in March, 1895. A shipment of bullion was commenced March 16th, and by December 30th, 1895, there have been shipped 3,220 tons of silver-lead bullion, and the furnace or smelting stack was not in blast half the time. From January 1st, 1895, 52,000 tons of ore were mined from the Blue Bell claims and transported to the works, consisting of first and second class or concentrating ore, lime rock for fluxing, etc."

In his bulletin on the Slocan and Aimsworth districts, published in the 1897 Report, Mr. W. A. Carlyle, then provincial mineralogist, supplements this information with a note stating that the plant is located on a small peninsula on the same side (or the east) of Kootenay Lake as the mine, but about eight miles south. There are three main buildings, the roast house, smelter and concentrator, besides the smaller ones for offices, laboratories, workshops, etc. The concentrator contains two Blake crushers, 9 by 15 inches, 4 4-compartment jigs, 2 double collum jigs, 2 two-table slimes tables and two frue vanners, and has a capacity of 200 tons of ore per twenty-four hours. There are four 17 by 65 foot reverberatory furnaces in the roast house of 12 tons capacity each per twenty-four hours, while in the smelter is one 100-ton water-jacketted blast furnace. In the engine room is a 150 H.P. Corliss engine for the concentrator and sampling works, an 85 H.P. engine for the blower, and a 30 H.P. engine for the dynamo, for the electric lighting of the whole works.

## CANADIAN GRAPHITE DEVELOPMENTS.

(Specially Contributed.)

The Calumet Mining & Milling Graphite Company is carrying on operations on its property situated near the village of Calumet on the Ottawa river, Argenteuil County, and expects before long to refine the output from the mines in a modern graphite milling plant, which, it is contemplated, will be erected next spring. The occurrences here have been known for over 45 years: Sir William Logan having referred to them in his report of 1863 as follows: "Workable deposits of plumbago occur in the township of Grenville." The present company acquired the mining rights for 258 acres in the year 1899 from the Hon. J. K. Ward of Montreal. The property is about 1,200 feet wide, and extends from the Canadian Pacific railroad tracks back over the mountains, a distance of about one and three-fourth miles. The graphite in Calumet occurs in the Laurentian formations in beds or seams of from a few inches to two and even three feet in thickness. The country rock is a greyish gneiss, often interrupted by bands of crystalline limestone, the disseminated flake graphite occurring also in the latter. The graphite deposits are often interrupted, giving place to lenticular masses which are sometimes pure

and at other times mingled with carbonate of lime, pyroxene and other minerals. The graphite is, however, not confined to the limestones and gneisses. Large crystalline scales are occasionally disseminated through pyroxene rock, sometimes also through quartzite and diabase. On the Calumet property the graphite occurs either as disseminated flakes, usually in limestone and gneiss, or as true veins, both columnar and foliated; the latter are found frequently cutting the granite and other igneous rocks as well as the gneiss. The mine is on the slope of a hill which raises some 300 feet above the level of the country. At a height of 180 feet from the level a shaft has been sunk to a depth of 85 feet. This shaft follows several veins of graphite of the columnar and foliated variety, which cut the gneiss at nearly right angles. The width of veins varies from a few inches up to 36 inches; the bottom of the shaft is reported to have 30 inches of pure graphite. There are also a number of excavations and outcrops all over the hill, exhibiting the occurrence of graphite, mostly in the disseminated variety, in granular limestone, gneiss and quartzite. At present a tunnel is driving at the foot of the hill with the intention of tapping the veins in the shaft.

The length of the tunnel, up to a point vertically under the shaft, will be approximately 175 feet. Most of the graphite is similar to the Ceylon variety, and in order to experiment with the ore, with a view of determining the best milling process 65 tons have been shipped to the Globe Refining Company of Jersey City, N.J. It is reported that 32 tons of flake graphite have been obtained. Several large sample lots have been shipped to the Morgan Crucible Co. of London, also to I. H. Gautier & Company, Jersey City, N.J., and to Messrs. Baker & Bishater, at Grosse Almerode, Germany. It is stated that these firms, have made crucibles of this graphite and that these have been found equal in quality to those made from Ceylon graphite. One of the firms have placed a large order for material with the company for delivery as early as possible. Electric power for mining and mining operations can be obtained from Rouge river, five miles distant, where Messrs. Rogers & Co. have a water-power capable of supplying some 1,000 h.p. About 25 men are at present employed, with Col. M. I. Keck, of Scranton, Pa., as manager.

The graphite deposit at Oliver's Ferry, in the township of Elmsley, lot 21, Range VI., is being worked at present with a force of 20 men. This property has been worked at intervals by different people for more than thirty years, and here perhaps graphite was first mined in Ontario. Mr. Rinaldo McConnell, of Ottawa, is the present owner. The mineral occurs in rocks of the Grenville series, similar to those in the Province of Quebec. At the principal openings the older rocks are overlaid by Potsdam sandstone. Where first opened the graphite was found in a sandy, greyish, decomposed gneiss, and the graphite was well disseminated throughout a belt of considerable extent. The early operations date back as far as 1872. After working for several years the mine and mill were closed



in 1875-76. With small interruptions the property lay idle until 1901, when Dr. Tyne, of Toronto, secured a diamond drill from the Ontario Government, and bored several holes to test the depth and extent of the deposit. These borings showed the presence of graphite of good quality, in large quantity. The property then passed into the hands of the present owner, Mr. Rinaldo McConnell, who continued boring with the diamond drill in 1902. The value of the property was in this way ascertained and the presence of large bodies of ore determined, and the latter compare favorably with those of the Buckingham District. Mr. McConnell has erected a mill at the village of Port Elmsley, utilizing a water power of about 50 h.p. on the river Tay.

The principal operations are carried on at a pit 250 feet long, with a width of from 8 to 15 feet, and a depth of from 5 to 15 feet. The graphite is found in a bed of limestone, also in gneiss. The dips are generally flat, from 5 to 10 degrees, but at some points, especially on the northeast end, a dip of 40° can be noticed. The openings are made at the crown of the anticlinal. All the graphite appears to be of the disseminated variety, and columnar graphite was not noticed.

All the ore is treated in a mill which is distant about three miles. It is first roasted in an ordinary kiln, to drive off the moisture; then it passes through a set of crushers and thence is treated by pneumatic jigs, where the flakes are separated from the gangue. After grinding in buhrstone mills the product is sized by screens into four grades. It is estimated that the material mined yields an average ten per cent. clear graphite. The mill treats from one to two tons of ore per day.

## ON THE EXAMINATION AND VALUATION OF MINES.\*

By John E. Hardman, S.B., Ma.E., etc.

(Continued.)

### Valuation of Mines.

To attempt this portion of my subject may seem a very rash proceeding to the majority of my professional colleagues, for while the topic has been touched upon by many engineers who have written, there are but few who have thought any approximate valuation possible.

In what follows, the writer makes no pretence of solving a difficult, if not impossible, problem; he only attempts to show the analogy and to give a method by which a close approximation to the actual value may be obtained.

The problem of valuation is not an exact one, the factors which enter into it being many and diverse in character, and one has also to take into consideration the points upon which capitalists insist.

First, there must be a provision for the ultimate return of all the capital contributed, whether as purchase money, working capital, or otherwise. It is a frequent thing, both on this side of the water, and in the Old Country, to read in annual accounts of various corporations that certain sums have been "written off." Such sums so written off being very rarely deposited in any bank as a redemption fund proper. It is probable that there is hardly one in a hundred present joint stock companies which can show any separate depositary account for the different items that are so glibly written off in their annual statements. Depreciation and redemption accounts may be headings of ledger pages, but they are rarely actual accounts whose sums are safely invested in banks or securities.

In the United States it is customary to consider that the investor will make his own provision for the return of the capital out of the large dividends he is receiving, but in England the matter is usually regarded as the duty of the directors. What percentage of the capital must be recouped each year depends, of course, upon the number of years the mine will be in operation.

The return of the original capital *intact* involves the previous consideration of the capitalization necessary to purchase the property, equip it properly, and provide for the necessary expenditures until the property becomes self-sustaining or profitable. Such consideration provides for no "water," the capital must be commensurate with the dividends expected from the scale of working which is proposed.

Secondly, there must be provision for an interest return upon the amount of money invested; as to what this interest return shall be, it may perhaps be difficult to get capital to agree. Manifestly the interest or return must be larger than obtains in financial centres for standard securities having a long life; there are hazards attending all mining enterprises, which, of course, must be more or less safeguarded against, but which are inherent in the business. Floods and underground fires, crushing of large areas of open ground, sudden and unexpected faults of dislocations, all contribute to demand a higher rate of interest per annum than is necessary for other investments. Since this rate must be higher than for commercial ventures, we may take the extremes as ranging from 10 per cent. where the mine has a long life, and the management is known to be good, to 30 per cent. where the deposit is known to be of limited extent, or the market for the product is variable, or the control is in the hands of people not above suspicion. In addition to the dividend paid to sinking fund whereby provision is made for the return of the original capital, wherever the depreciation, or wear and tear of plant, is not charged off annually to the working cost, there must also be a sinking fund for depreciation. As a matter of

\*Trans. Can. Soc. of C. E.



good mine accounting the wear and tear and repair items are charged usually to expense, so that a sinking fund for the recouping of capital should be the only necessary deduction from profits.

Out of the profits, therefore, there must come (a) a certain definite amount sufficient to return the whole of the original capital before the death of the mine, and (b) a certain other annual amount, varying from 10 per cent. to 30 per cent. for the interest on that capital.

The careful and accurate examination already made has determined the prominent factors of — what the cost of extracting and marketing the ore will be; what the average value of the ore is; and what total amount of ore is certain, and what amount therefore is probable, within the boundaries of the deposit; the average profit per ton is therefore deducible. It will have furnished the data by which we may assume a probable yearly capacity of production, and approximate the yearly profit; it will also bear witness to the enduring, or temporary, character of the deposit. From these data, as already determined, the (a) working term or life of the property is obtained, approximately; (b) the safe annual production can be determined, and (c) the probable annual profit is also known—therefore, we shall have essentially the factors of an annuity, since we know the term, and the probable annual amount received.

Another important item for the solution of the problem is the matter of the proper annual output having regard to the greatest economy of production and the least waste of mineral. American practice has been to work out a deposit as rapidly as possible, extracting the largest percentage possible in a few operations, and permitting, often a very considerable percentage of mineral to remain in the waste or tailings; continental practice on the contrary has been to mine annually a comparatively moderate output, but to discard nothing as waste until all possible values have been extracted therefrom.

The last ten or dozen years has seen a closer *rapprochement* on the part of American mines, due probably to a realization that the assets of any one mine are more or less definite, and that mining is a destruction of assets. This fact is not realized by investors so much as it should be. To paraphrase from some legal judgments delivered; the value of occupation of a mine is only created by the destruction of the property, the owner or worker commits legal waste by working. The tenant practices—not a right to use and *enjoy*, but a right to *destroy*, a part of the actual property.

The process of mining is analogous to the destruction of a landed estate where the landlord, by selling off each year a small plot from a large area, at last finds himself with no freehold left.

As a matter of record, the writer thinks he is correct in stating that the productive life of an average mine runs from seven to fifteen years. It is to be expressly understood that giants in the mining world, like the Calumet and Hecla, the Homestake, Alaska-Treadwell, and others, with large surface areas and enormous widths of ore bodies, are not to be considered as "average," but extraordinary mines. The first step, therefore, is to arrive at the probable maximum average output per year which can be mined with the greatest economy and at the largest profit; this output being found, and the total positive and probable ore tonnage having been ascertained by the examination, the shortest life of the mine in years is easily obtained, thus furnishing the *period* during which dividends may be expected.

Knowing the period, the annual sum to be earned for the sinking fund for the redemption of capital is then calculated; to which must be added the annual sum to be paid as interest on the capital invested, which (as before stated) will depend somewhat on the life period of the mine, but which in any case should not be less than 10 per cent. The annual charges then will be X for the sinking fund, and Y for the interest charges. We may then calculate the value on the basis of an annuity, knowing the life or period and the annual dividend. Or, we may take the total *profit* on the positive and probable ore, and from that sum deduct the sum of the charges X and Y for the number of years of life of the mine, the remainder will be the approximate value of the property.

As an hypothetical case, let us take a property where the engineer's examination showed a net value of \$1,000,000, but with a sufficient quantity of ore reserves for only five years' work, with a proper plant. It is evident that whatever sum be paid for that property must be recouped within the five years' life shown; in addition, it must pay the minimum percentage (or interest) mentioned, i.e., 10 per cent. per annum, or 50 per cent. during the life of the mine. Manifestly then, this property must return 30 per cent. per annum, upon the investment, which is assumed to be \$1,000,000. To do this the mine would have to earn \$500,000 more than the \$1,000,000 shown in the report, and, in all probability, the purchase would be declined. The figures taken in this illustration are, of course, extreme.

As a further illustration, reference might be made to the remarks made by Dr. R. W. Raymond at the New Haven meeting of the American Institute of Mining Engineers, held in October, 1902. In referring to certain matters, it transpired that a certain copper mine had, as "positive ore," a sufficient amount to net the sum of \$2,000,000 for five years, and that the price asked for the property was \$10,000,000. Dr. Raymond said that the property was not actually worth more than one-half that figure.

even if the reports and estimates were true, and for the following reasons:—

The life of the mine should be taken as no longer than the time required to mine all the blocked ore, in that case five years; that the net annual profits should not be less than 20 per cent.; that a sinking fund to return the purchase price would also require 20 per cent. per annum, and that therefore the purchase must be considered as a  $2\frac{1}{2}$  years' purchase and not as a five years' purchase.

Each case will require modification and treatment according to its qualities and peculiarities. Almost all mines begin with the payment of small dividends, increasing the same as the maximum capacity of the property is attained, to be followed by a period of constant dividends, after which the amount of the dividend decreases as the mine approaches exhaustion. For the purposes of valuation these crescendo and diminuendo amounts may be averaged at an equal sum for each profitable year of the mine's life, and remember that while it is not pretended that an exact valuation can be made, yet a sufficiently close approximation to guide the investor is possible.

Treated as an annuity, if the period, or life, were 10 years the tables would give the present value of a mine as 7.72 times the annual dividend, when money was worth five per cent. It must be remembered that the shorter the life, or period, of the property, the larger must be the profit per year. So that actuarial treatment of the life and profits of a mine tends to a lower *present value*, the higher the annual rate of interest or dividend becomes.

From these brief statements it will be evident that an approximation to a correct valuation is possible if the valuer has a correct conception of his subject. In many cases one's client does not want the engineer's valuation; he wants *facts*, and will value according to his own ideas and the experience of the particular business he has been engaged in. But when one is acting for a syndicate or corporation such valuation is frequently requested.

Unfortunately, in all legal proceedings connected with mining companies we have had no recognition of the necessity to compel the redemption of capital, and, in fact, it has been held by the high courts of justice in England, that it is not obligatory on the directors of a company to make any reserve of profits for the purpose of meeting the ultimate loss of capital which ensues on the exhaustion of a deposit, or on the expiration of a lease or title. Since there is no law on this subject, the questions of prudence and of interest are not only neglected by most of our companies, but seem to be actually unknown to them, but all will agree that should such a provision ever be made compulsory by law, it will unquestionably tend to check immoderate speculation and to safeguard investments in mining enterprises, and when such a law is introduced, the question of

the practical and proper way of examining and valuing mineral deposits will have to be considered at the commencement of every mining undertaking in a most serious manner.

(To be continued.)

## THE RETIREMENT OF MR. GRAHAM FRASER.

Mr. Graham Fraser, whose latest portrait we have the pleasure of printing in this issue, represents in himself more than any other one man in the Dominion, the beginning, the progress and the present fruition of the iron and steel industries of the Dominion. As a matter of record, and for the information of our readers, we present a condensed sketch of Mr. Fraser's life.

Mr. Fraser was born in New Glasgow in the year 1846, and is now in his 60th year. His father was Mr. Thos. Fraser, and his mother Miss Charlotte Dix, of Pictou. Mr. Thos. Fraser for many years was a shipbuilder in New Glasgow, and the ship-yards then were a great attraction to the younger man who, however, reversed the usual order of learning his trade at home and going abroad for larger fields by learning his trade in the United States, to which he went at the early age of sixteen. In Providence, R.I., he served an apprenticeship of three or four years in one of the large blacksmithing establishments of that city. Afterwards he had a year's experience in ship blacksmithing, in the ship-yard at Maitland, N.S. At the age of 23 he began work on his own account by securing a contract for the iron work of the wooden vessels which were then building by the late Senator Carmichael. With this contract he also undertook the manufacture of all galvanized iron work necessary for ships. Succeeding in the first years of his independence, he took a partner five years later in the person of Mr. G. F. McKay, and together these gentlemen established the Hope Iron Works at New Glasgow, for the manufacture of railway spikes, springs, axles, etc., and for the carrying on of a general forge business. Shortly after a steam hammer was set up in the yards, and as the business grew yet another steam hammer was added, and the name of the firm was changed to that of the Nova Scotia Forge Company. Eleven years after beginning his work in Nova Scotia the forge works were removed to the present town of Trenton, on the East River of Pictou, where new buildings were erected, commensurate with the large amount of business that had been developed during the eleven successful years since its inception.

The Nova Scotia Steel & Forge Company was floated as a corporation in 1882, and it is evidence of the skill and good reputation of Mr. Fraser among his fellow townsmen that the capital requisite for the Steel & Forge Co. was supplied entirely by them. The expansion of the steel business led to the investigation of opportunities for making



crude material, and subsequently, a company engaged in the smelting of iron ores, the mining of coal, and the building of their own railway. The works at Ferrona followed those at Trenton, and the works at Sydney have followed those at Ferrona. As president of the first company, and as vice-president and managing director of the Nova Scotia Steel & Coal Company, Mr. Fraser has been an unqualified success. His prudence, his judgment and his enterprise have helped forward and put upon a solid basis the steel business of the Dominion.

In his brother, Simon A. Fraser, now deceased, Mr. Graham Fraser had a cordial and intelligent supporter, and one whose intimate personal knowledge of the steel industry allowed Mr. Graham Fraser to devote his own attention to the commercial side. Mr. Fraser remained as the managing director of the Nova Scotia Steel & Coal Company until December, 1903, when he resigned to accept the position of Director of Works, with the Dominion Iron & Steel Company, on Jan. 1st, 1904. Under Mr. Fraser's direction the Dominion Iron & Steel Company have groped out of a position of great unsoundness to one of solidity and promised profits. He has had the pleasure of seeing the works of the Dominion Company put on a commercially paying basis. His resignation from the Dominion Iron & Steel Company, as he has personally told the REVIEW, comes from his desire to take a well-earned rest after nearly thirty years of continuous hard work in the steel business.

As a man, Mr. Fraser is well known to members of the Canadian Mining Institute. He is quite unassuming, always pleasant, and ever ready to render a service when called upon to do so. The story of his career during the last thirty years is largely the industrial history of New Glasgow, for not only is Mr. Fraser a steel man, but he has fulfilled his duties as a citizen in serving on the Town Council of New Glasgow, and is acting as chairman of various committees established by that town. The REVIEW sincerely hopes that he may live many years to witness the substantial national benefits he has given to the Dominion through his efforts in the steel industry.

## THE PROPOSED REVISION OF THE ONTARIO MINING LAWS.

To the Editor:—

Sir, The last three issues of the MINING REVIEW have contained both editorial comments and correspondence on the matter of legislation (both by statute and by Order in Council) as affecting titles and discoveries in the new Temiskaming Mining Division, in which are situated the unique deposits of argentiferous cobalt and nickel which have recently attracted so much public attention. Likewise, the press of Ontario, and particularly of Toronto, has contained wonderful emanations from the pens of some writers, not only as regards the production of this district, but also in respect to

suggested or intimated changes in the mining law of the province.

Many of the letters published in the REVIEW have contained excellent ideas in respect to suggested amendments to the mining law, and in an interview which I recently had the privilege of having with the Hon. Frank Cochrane, Minister of Mines, I learned that he is striving hard to get at facts, and also to get at the wishes of the *actual miners* in Ontario, in order to lay down a basis for a new, permanent and satisfactory mining law which shall not need continual amending by Orders-in-Council. Perhaps you will give me space in which to make one or two comments that have not yet appeared in your journal.

The chief ground of complaint, and also of discussion, which I have personally noticed in frequent visits to the Cobalt district this year, has been the impermanence, or lack of any fixity, of the mining law owing to the frequent use of Orders-in-Council, which have affected both the acquisition and the tenure of mining lands in the province. The refusal of the Government to accept the stipulations of the existing act, or, in other words, its refusal to accept the oath of the locator, *as an oath*, unless supported by subsequent inspection of an inspector, is another frequent, and perhaps just ground for complaint. An oath or affidavit in ordinary legal affairs is proof, and accepted as such by the Courts. Why it should not be accepted, in its application to the mining law of Ontario, has only been explained on the ground that prospectors did not recognize the sanctity of an oath, and that, in consequence, frequent attempts at blanketting of large areas of ground had been made. That some such attempts have been made is not denied.

In its avowed intention to discriminate between locations filed for silver and those filed for iron, copper, or other minerals, by reducing the size of the claim located for silver to one-half the size of a claim located for gold, the Government has introduced another subject for dissension, and for which there can be little or no valid reason. In older and more experienced mining countries, such as British Columbia in this Dominion, and the various states of the United States, a claim is of uniform size whether located for gold, silver, copper, lead or other mineral, and because, during the last year or two years, the extraordinary richness of the upper portions of the veins in Coleman Township have been so valuable is no better reason for reducing the size of such claims than was the extraordinary richness of some of the placer claims in the Klondike region excuse for varying their size from that stated in the regulations for mining lands in the Northwest Territory.

The proposed imposition of a royalty on silver is a point which has not, as yet, been particularly objected to; the royalty on the nickel and cobalt contained can hardly be insisted upon unless a royalty is also imposed upon the nickel and cobalt contained in the pyrrhotite ores of the Sudbury district. In a minor way, also, there has been more or less



fault found with the subservience of mines and mining to timber grants and lumbering interests. Your own experience in the Province of British Columbia has specially qualified you to expect and to comment upon this remarkable divergence of views as expressed in contributions to your own columns and in contributions to the daily press, and perhaps such experience will preclude, in your own mind, any hope of an amended law passing, which will be satisfactory to all parties.

In the various meetings of miners and those interested in mines, called by the Department of Mines for the latter part of last month, and to be supplemented and enlarged by a mass meeting of representatives to be held in the city of Toronto on or about the 11th of December, the Hon. the Minister of Mines is doing all that is possible for a man to do to give full expression to the divergent views of the men who are desirous of obtaining mines, or who have already obtained mines, in the Province of Ontario. The Hon. Minister has emphatically stated, that he, personally, and the Government through him as minister, desire the fullest expression of sensible views respecting proposed changes in the mining law of the province. Further than this no man can go, and if the December meeting fulfils the expectation of Mr. Cochrane he will be able to go to the next session of Parliament with a draft of a mining law which has already received the full acquiescence of men who are interested in the business of mining.

This letter is not written with the intention of espousing any particular line of argument, or any particular amendments to the existing law, but more with the hope of inducing every individual, either who is interested, or who hopes to be interested, in the mines of Ontario, to come forward and be heard at this mass meeting in Toronto, so that he may have every chance of getting others to agree with his views, also that he may be perfectly satisfied that he is not in the minority in respect to the changes which he desires to see made.

JOHN E. HARDMAN.

Montreal, P.Q.

Nov. 5th, 1905.

#### ONTARIO MINERS' MEETINGS.

During the past week or so meetings have been held in various sections of Ontario, in compliance with the suggestion of the Minister of Lands and Mines to discuss a proposed revision of the mining law of the province. Unfortunately, in several instances the real issues have not been touched upon and many irrelevant suggestions have been made. These meetings, however, are of course merely preliminary to the Convention that is to be held in Toronto later on, and doubtless then the subject will be approached from all sides, and thoroughly threshed out. At the meeting held at Sault Ste. Marie on October 24th, however, the defects of the present system as regards the inspection of claims, were pointed out, and a recommendation was made to the Government that the affidavit of the locator be accepted as sufficient evidence of discovery, but that it be required that an expenditure of \$100 be made on any claim so located within 90 days after the discovery thereof.

The following gentlemen were appointed delegates to the Toronto convention:—Messrs. W. H. Plummer, John

McKay, A. C. Boyce, M.P., U. McFadden, A. B. Wilmott, F. J. S. Martin, T. A. Hand, J. L. O'Flynn, James Stobie, C. Williams, J. W. Curran, T. Johnston.

At the Sudbury meeting some 100 persons were present, and the following resolution was passed:

"That all lands belonging to the Crown, whether valuable for pine or not, should at all times be open for exploration and sale, subject to regulations for protection of Crown property."

Mr. A. P. Turner, President of the Canadian Copper Co., advocated the appointment of a commission by the Government to investigate the mining industries of the province.

At the Belleville meeting, held on the 29th of October, the following resolutions were passed:

"The title to minerals should be absolutely separate and free from any rights or claims of lumbermen.

"Tax titles should be valid from date of deed.

"The Government, at the beginning of the year, should give the clerk of each township a list of lands owned by them, and thereafter send to him the number and concession of each lot subsequently sold immediately after sale.

"Existing timber licenses to be investigated and their present position and effects ascertained.

"The Government should continue assistance given by former governments to make roads into mines, particularly in the locality of their own lands.

"Under all charters of mining companies there should be the right to the minority to appeal to the Government, or to the court, to compel the majority to work the property or have the property sold.

"The rights of employees should be extended on the same principle as under the Mechanics' Lien Acts, so that the company's interests in mines, buildings and machinery should be liable.

"There should be no royalty or mining tax, as this would at once put an end to mining in this country.

"The affidavit of the prospector alone should be sufficient, without the affidavit of two others as at present required.

"That the commission be requested to urge upon the Ontario Government to use its influence with the Dominion Government, so that all mining machinery (not made in Canada) should come in free of duty.

"That this section should be made a mining district.

"That the Hydro-Electric Commission should be requested when examining the water-powers in the County of Hastings to consider the importance cheap electric power would give our mining industry.

"That two mining experts should be appointed, to be known as inspectors of Government lands, one for the province east and the other for the province west of Port Arthur, who should inspect and report to the Government on all disputes touching mining claims.

"That the prospector should be protected as far as is consistent with the mining interests of the country.

"That the mill test of ores at the School of Mines at Kingston should be given at cost.

"That a bounty, or other assistance, should be given the arsenic industry.

"That corundum should be treated the same as other minerals, save that it should be required to be milled in the country.

"That the miner's bonus of 50 cents a ton now paid does not attain the desired end, and could well be withdrawn, but it is hoped that the commission will lay before the Dominion Government the advisability of imposing a duty on iron ore of 75 cents per ton for the protection of the iron industry in the county."

Delegates to the Toronto convention were appointed as under:—Messrs. W. A. Hungerford, A. W. Coe, D. G. Kerr, D. E. K. Stewart, Mr. Kirkegard, Mr. Cushman, Mr. Farnham, Mr. Geo. Weese, J. W. Pearce, M.P.P., and W. B. Northrup, M.P.

At Kenora, on the 31st October, the following resolutions were passed: "That this meeting recommend



that the Government vote an amount of money as an appropriation for the purpose of demonstrating the continuity of the veins in this district to a depth of 1,000 to 1,500 feet, and in the event of the work being done on an existing property the owners of such property to guarantee one-half the cost before the work is commenced."

"That this meeting recommend that in cases where lessees of mining properties have done development work and expended money in improvements thereon to an amount more than sufficient to cover the cost of acquiring title in fee simple to the properties in question, special consideration should be given, and unless in cases where evident abandonment has taken place a patent should be granted in respect of such properties."

A largely attended meeting was held in Madoc, on October 27. The following resolutions were passed:

"The title to minerals should be absolutely separate and free from any rights or claims of lumbermen."

"Tax titles should be valid from date of deed."

On November 2nd, an interesting meeting was held at Kingston, at which the following resolutions were carried:

"That this meeting approve the present form of application for mining lands and of affidavit of discovery—part 6 of Act—but not the affidavit in support of discovery—(mineral or bona fide indications of mine)."

"That the clause requiring two witnesses to prove discovery, etc., be withdrawn to conform with B.C., etc., mining acts."

"That the Act should provide for inspection of discoveries, in certain cases to ascertain their bona fide, but an inspector shall not have the power to throw a claim open so long as the discoverer is carrying on development work as required by the Act."

"Locator of mineral claim shall have the right to all the minerals within his claim, excepting in those cases of iron, mica, and other minerals, which are located in claims larger than the ordinary mineral claims."

"That the clauses in regulations for mining divisions with reference to planting discovery posts, blazing and defining the location, etc., be made applicable to territory outside mining divisions (clauses 18 and 20, reg. for mining reg.)."

"That Sec. 28 of regulations for mining divisions be amended to allow applicant to obtain a record of his claim in 30 or 60 days, instead of 90."

"That leases should be made more simple, free from oppressive and onerous restrictions, and with provisions for facilitating assignment."

"That in the opinion of this meeting the bounties on pig iron made from foreign ores, should be abolished."

(This resolution is to be forwarded to the Federal Finance Minister.)

"That the present provisions for assays under Government supervision be supplemented by utilizing the equipment of the mining laboratory of the School of Mining for testing ton or carload lots of ores."

"That legislation be passed to further protect the miner in payment of his wages, and that he have first claim against the property of the operator of the company or companies in cases of insolvency."

The following delegates were elected to the Toronto convention:—Dr. Goodwin, Mr. T. R. Caldwell, Prof. Brock, R. E. Kent, Prof. S. Kirkpatrick, Mr. Clifford Smith, Brockville; Mr. E. L. Fraleck, Mr. H. Richardson, Mr. Boyd Caldwell and Mr. G. Y. Chown.

## THE MONTH IN BRITISH COLUMBIA.

(From Our Own Correspondent.)

Nelson, Nov. 1.—The month has been quiet in mining and there has been little extraordinary in the way of developments. One feature that at one time seemed as if it would give rise to some trouble was the suspension of shipments from the St. Eugene mine, in consequence of the fire at that property, which destroyed the hoist. It was declared that as the chief supply of ore for the lead

stacks at Nelson and Trail came from that particular point the smelters would be obliged to close. However, the Highlander of Ainsworth Camp, is now in better condition for shipping and a good supply of ore is looked for from that direction, within a few weeks. Mr. Cronin states meanwhile that the St. Eugene will certainly be again producing by January 1, and in all probability some time ahead of that date, so that a shut down, even if it comes, will not be serious.

The Zinc Commission is still pursuing its labors and the opposition to it has died a natural death. It is considered, however, that the usefulness of that commission will be greatly enhanced if it is extended into next season. There has not been nearly enough time this year to examine anything like the whole of the zinc properties even within the Kootenay, without considering the number of meritorious properties at the Coast. The trouble with those would seem to be that their owners, following the bad example of many Kootenay men, have not nearly sufficiently developed their holdings, so that a purchaser is asked to take much on trust and pay a heavy price, often enough, for that trust. In connection with the Zinc Commission it may be stated that the zinc reduction works at Frank have made a trial run and succeeded in producing some zinc matte. The run, however, was purely experimental, being undertaken to satisfy some French capitalists of Lille, who are financing the undertaking for the founder, Mr. C. Fernau, to a large extent. Mr. Fernau, it is understood, is about to open up the Pilot Bay smelter for the purpose of the reduction of zinc, a position far better situated with regard to the zinc properties than Frank. The Monitor Ajax on Slocan Lake, has started work on its concentrator and in a short time some good results should be heard from it. Nothing has been heard lately of the fortunes of the magnetic separator at the Payne mine, the only statement recently made about that mine being that it was shipping a little ore, and that the Zinc Commission were not allowed to examine the property. The latter assertion is, however, based solely on a none too reliable local paper, which has made a hot fight against the Zinc Commission, or rather against one of its members. The plant at Kaslo is also in abeyance, but it is stated that arrangements are being made whereby some ore, which is not chemically combined with iron, will be put through that plant, coming from the Lucky Jim. In fact, from one reason or another, the whole of the plants connected with the separation or reduction of zinc are more or less "hung up" at the present time.

On the other hand, the mill lately installed at the Reliance mine, near Nelson, working under the Hendryx process, is stated to be a success, Dr. Hendryx himself, making a statement to that effect before his departure east. However, no official statements have as yet been made as to results, runs or charges. The La Plata mine on Kootenay Lake, is now putting up a mill and its manager, Capt. Trethewey, declares that he is in a position to take out 20 tons of ore daily on a conservative estimate. The mines of the Lardeau, especially the Eva, are looking well, and much development work has been accomplished in different directions through the summer. At Poplar it is noted that the Great Northern mines are finding capital for the exploitation of their properties at depth. \$200,000 is to be raised, of which sum three directors are themselves advancing \$20,000 apiece. This, however, will lie over, probably until next summer.

There is much prospecting activity in the Crawford Bay district, but it is too early at present to look for any returns. At Marysville the new smelter management are still preserving their attitude of "It is no business of the public's."

In the Boundary the mines are looking and doing well, that is to say, among the principal shippers. Among the lesser fry there is some complaint about freight rates which is more or less justifiable. The Providence, of which great things have been expected, is seriously involved in litigation. An annual meeting has just been held and it is declared that machinery will be installed



and the property worked on a larger scale. This was also said in 1904, but the machinery did not materialize. It is claimed, however, that there was a profit made last year of some \$20,000, and a statement is published which purports to show this. This statement is about all that a mining report of receipts and expenditure should not be. The ore in sight is not mentioned. The amount of ore shipped is not recorded nor its average value. There is a statement of expenditures. The profit shown on the books is \$19,934.76, and it is arrived at by subtracting the liabilities from the assets, among which latter is placed \$44,814.27 for development work! Of this amount 25 per cent. is considerably allowed for depreciation!

Turning to Rossland Camp, it will be noted with pleasure that the camp is now picking up again. Shipments are regular and recent developments would show ore at depth on all the principal mines. The one drawback seems the concentration of the second class ores. A little of this is being done, but it is doubtful whether the profit made under the present processes employed is sufficiently large to permit the companies building larger plants. Yet there is no doubt that the future of the camp depends largely upon its concentration. The recent reduction in smelting rates has made available much ore which was formerly left unstopped and hence for some time it will be possible to extend the old stopes without opening up extensive and expensive developments. This has been the experience of the camp from the beginning. There are no regular walls to the veins and the ore shoots seem merely to get less and less in value on either side of a certain point. The wall is the limit of pay ore and the wall shifts with the lower smelter rate. But when concentration can reduce the ore at a cost of \$1 to \$1.50 per ton those walls will recede wonderfully and Rossland may then be the biggest low grade camp on the continent.

## ONTARIO MINING INTELLIGENCE.

(From Our Own Correspondent.)

The Court of Appeal for Ontario has just given judgment in the case of McConnell v. Erdman. The plaintiff, a clergyman, brought action to recover commissions on sales of stock for and money lent to defendant, the superintendent of the International Gold & Copper Company, operating in the County of Frontenac. At the trial plaintiff recovered part of his claim, and on appeal the judgment has been confirmed, with a slight variation as to value of stock.

The Temiskaming & Northern Ontario Railway commissioners are considering the advisability of building a branch of the road from Cobalt to the district between Kerr and Giroux Lakes, about three miles, to provide transportation facilities to the mining camps. At present the ore from these mines at these lakes is conveyed to Cobalt by water, a small stream running into Cross Lake having been made navigable by a dam, but this involves a portage of about two hundred yards at the dam, besides a haul from the mines to the water. If the road is built the ore can be loaded at once on the cars.

Reports have appeared recently in many papers respecting an alleged find of diamonds in Northern Ontario, near Sault Ste. Marie. Diligent inquiry fails to discover anything to warrant the report. The Ontario Bureau of Mines knows nothing of such a discovery, and none of the leading jewellers of Toronto, to whom the stones would naturally be submitted for an expert opinion as to their value, have heard of it. Some geologists have stated that diamonds might be found north of Lake Superior or in the Rainy River country, the formation being such as to warrant the opinion, and a repetition of this view has probably given rise to the report. Masses of garnet have been found, but not of gem value.

The stamp mill of the Big Master Mine, near Kenora, in Lake of the Woods district, recently yielded 140 ounces of gold in a twenty-three days' run. This is considered a remarkably good showing.

The Ontario Bureau of Mines has had inquiries from abroad respecting some of our ores, which show that Canadian minerals are attracting more attention, probably the outcome of the Liege and other exhibitions. A firm in Rotterdam, Holland, inquires about supplies of iron, copper and nickel, and an Antwerp company asks for copper and silver-cobalt ores. P. B. MacNamara, commercial agent at Manchester, in a communication to the Department of Trade and Commerce, reports inquiries from some of the English chemical companies for cobalt ores for which there is likely to spring up a demand in Britain. So far, all the cobalt ores produced here have gone to the United States.

Mr. J. D. Hubbard, general manager of the Western Mines' Development Company, Chicago, and a pioneer in the gold fields of Nevada, which at one time attracted as much attention in the United States as the Cobalt field is now doing in Canada, recently paid a visit to Cobalt. He is much interested in the discoveries there and is making a close study of them.

The charter of The Hutton Mining Company, Limited, incorporated in Ontario, has been cancelled.

The following mining leases have been cancelled by order of the Ontario Minister of Lands and Mines, for non-payment of rent:—Lease dated 9th March, 1893, to Robert Forbes, George L. Chesebrough, and Harry G. Ingersoll, all of Duluth, Minnesota, for the south half of lot 11, in the 5th concession township of Coffin, 146½ acres; lease dated 3rd April, 1900, to Nicholas Rowe, of the township of Waters, for the south forty acres of the north half of lot 5, in the 3rd concession, township of Waters, district of Algoma.

The Pittsburg Coal Company, which has the contract to supply the fuel for the Canadian Northern Railway, is completing the immense docks at Port Arthur as rapidly as possible, and it is expected the first cargoes will be unloaded within a few weeks. The company hoped to have 1,000,000 tons delivered this fall but this has been found impossible. The dock will have a frontage of 1,200 feet and will extend back 2,500 feet to the shore, and it will be solidly filled with sand. The Atekokan Iron Company is building a dock of 650 feet frontage, with the same depth, on the adjoining property, on which its furnace, coke ovens, etc., will be erected. One furnace will be ready next fall and work on a second may be commenced in the spring. The ovens will be connected by overhead bridges with the Pittsburg Company's coal dock to facilitate the delivery of fuel. The government breakwater will be extended in front of both these properties. The Canadian Northern tried the experiment of bringing coal all the way by water from the mines in Nova Scotia, in which Messrs. Mackenzie and Mann are interested, but without return cargoes of grain or ore this would not pay, and besides the coal was not found to be up to the mark for steaming, so the contract was awarded to the Pittsburg Coal Company.

Mr. Fox, of Fox & Ross, mining brokers, Toronto, has returned from a combined business and pleasure trip to the West. In conversation with your correspondent he expressed himself in optimistic terms as to the future of mining in Canada. He says there is a great deal of ignorance on the subject, largely due to the fact that the newspapers, unless paid so much per line, will not give information to the public. The brokers are deluged with inquiries, and any information they give is naturally supposed to be prejudiced in favor of properties in which they are interested. Speaking of British Columbia, Mr. Fox says the feeling is very hopeful. He considers the prospects for Rossland, notwithstanding past depression, the effect of which is still seen on the streets, as most promising, while the outlook in Boundary is also exceptionally good.

Mr. D. D. Mann, of Mackenzie & Mann, is developing two claims he has secured at Cross Lake in the Cobalt district, and has brought in some expert miners from British Columbia, where he has interests in silver mining, to work these claims.



A number of Canadian stockholders in the Homestake Extension Mine, near Deadwood, South Dakota, took advantage of a cheap rate arranged by Douglas, Lacey & Co., the promoters, for an October trip, to see the mine in which their money is invested. They appear to be pleased with the prospect. A drift of 1,200 feet has been run into the hill and the ore is being stoped. A stamp mill and reduction plant is about to be installed. The mine is said to be on the same ledge as the old Homestake.

## NOVA SCOTIA MINE INTELLIGENCE.

(From Our Own Correspondent.)

**Coal and Iron.**—The Londonderry Iron and Mining Company, have lately been enlarging the works and increasing the output. The Company has now over 200 men engaged about the works and at present are putting out over 100 tons of pig per day. The pipe foundry is in full blast and a general flourishing condition prevails.

At Torbrook contracts have been let for the sinking of two 300 feet shafts, the work having been undertaken by Mr. Patterson, the contractor of the Allan shafts, (which incidentally, it may be remarked, are the deepest shafts in the province).

At North Sydney the Nova Scotia Steel & Coal Co. have developed No. 3 mine so that it has outstripped the famous Princess pit in the matter of production.

At Lourdes the Allan shaft has at last intersected the well known Ford seam.

**Gold.**—Mr. Rickard's report is expected to be ready for distribution about Christmas and is anxiously awaited by persons interested in gold mining matters. Speculation is rife as to his opinion on the point, i.e., the analogy to the structure of the Bendigo formation, and the prospect for deep mining on a similar scale in this province.

The following is a summary of the areas in the different districts, taken under Prospecting Licenses during the month of October:

| Quoddy          | District..... | 78 areas |
|-----------------|---------------|----------|
| Miller's Lake   | ".....        | 20 "     |
| Stormont        | ".....        | 105 "    |
| Broad River     | ".....        | 6 "      |
| Leipsigate      | ".....        | 9 "      |
| Cow's Bay       | ".....        | 26 "     |
| Mill Village    | ".....        | 48 "     |
| Ragged Falls    | ".....        | 12 "     |
| Gold River      | ".....        | 27 "     |
| Brookfield      | ".....        | 20 "     |
| Montague        | ".....        | 6 "      |
| Harrigan Cove   | ".....        | 3 "      |
| Malaga Barrens  | ".....        | 6 "      |
| Vogler's Cove   | ".....        | 12 "     |
| 15-Mile Stream  | ".....        | 49 "     |
| Jeddorie        | ".....        | 10 "     |
| Meagher's Grant | ".....        | 18 "     |
| Oldham          | ".....        | 4 "      |
| East Chezzecook | ".....        | 65 "     |
| Wine Harbor     | ".....        | 8 "      |
| Somerset        | ".....        | 32 "     |
| Salmon River    | ".....        | 51 "     |
| Lower South     | ".....        | 40 "     |
| Lochaber        | ".....        | 6 "      |
| Whiteburn       | ".....        | 22 "     |

The latest mill returns give crushings as follows:—

|                                                    |  |
|----------------------------------------------------|--|
| Sept.—Crease Mill at Mount Uniacke—                |  |
| 20 tons yielded 60 oz. 15 dwt. 0 grs.              |  |
| Aug.—Anderson Mill at Lake Catcha—                 |  |
| 2 1-2 tons yielded 13 oz. 14 dwt. 0 grs.           |  |
| July, Aug., Sept.—McCawley Mill at Stormont—       |  |
| 396 tons yielded 280 oz. 0 dwt. 11 grs.            |  |
| July, Aug., Sept.—Philadelphia Mill at Brookfield— |  |
| 701 tons yielded 378 oz. 16 dwt. 0 grs.            |  |
| July, Aug., Sept.—Libbey Mill at Brookfield—       |  |
| 2,985 tons yielded 1,159 oz. 15 dwt. 0 grs.        |  |

## BOOK NOTICES.

**Geology of Western Ore Deposits.**—The Kendrick Book and Stationery Company of Denver, have just printed a second issue of Prof. Lakes' Handbook of Colorado ore deposits in particular and other Western States in general. During the ten years which have elapsed since the first edition was printed there have been so many developments in the older mining camps and discoveries of new regions that a revision and enlargement of the original work became a necessity. In this second edition Prof. Lakes has endeavored to present the fresh examples of principles which additional experience furnished. The principles of general geology, in their application to mining geology, take up the first seven chapters (118 pp.), and these are followed by a chapter on the principal ores of the useful metals, and one on the theory of ore deposits, which later, we regret to say, will not clarify the atmosphere for a majority of Prof. Lakes' readers. Twenty pages of condensed heterogeneous abstracts of different individual theories is apt to leave the untrained reader more befogged than he was before perusal. The chapter on gold placers 1-2, epitomises much useful information, and the rest of the book is taken up with brief accounts of the most important mining districts of Colorado and the Great West. The book is desirable for reference, giving (usually) brief summaries of the chief producing districts which will be found valuable to the student. It is, however, rather a reference book for beginners than one for experienced men.

**Pyrite Smelting.**—In this compact, well printed volume of 310 pp., Mr. T. A. Rickard (Engineering and Mining Journal, New York), has collected and compiled the various discussions which appeared in the columns of the Engineering and Mining Journal from October, 1903, to February, 1905, on the topic of the direct smelting of sulphide ores, more commonly known as "Pyrite" or "Pyritic" smelting.

As is usual with Mr. Rickard's books, he has introduced the various contributors and summarized the gist of their conclusions in a chapter wherein his remarkable gift of language and freedom of expression are well shown. The fathers and chiefs of pyrite smelting, Messrs. Austin, Lang, Hixon and Carpenter, and some twenty or thirty other metallurgists, contribute to make the volume the latest and most authoritative expression of opinion on this branch of modern metallurgy.

**Technical Methods of Ore Analysis.**—It might seem, with works like Van Furman's already well established, that another treatise or handbook on technical methods of analysis would find small room for usefulness. That such is not the case is abundantly established by the record which Mr. A. H. Low's book, (John Wiley & Sons), has already made. Beginning his commercial career as an analyst, in Leadville, in 1877, Mr. Low has had, for more than a quarter of a century, uninterrupted success in dealing with the many and varied problems which constantly come before the analyst in such a metallurgical centre as Denver has been during the last thirty years. There is, probably, no other chemist in the United States whose experience and professional necessities have so well qualified him to write on technical analysis.

The arrangement of chapters in the book is well conceived, and the short chapter on apparatus makes one wish it were three times as long.

The author's own methods for the determination of copper by sodic thiosulphate, of lead by potassium permanganate, of alkalies, and of zinc are included, of course, but the author is most modest in his presentation of the claims of his new methods.

For the metallurgical chemist we know of no one volume for his library that can compare with this of Mr. Low's, both for usefulness and for the unravelling of knotty problems. We can cordially commend this book to our readers.



## MINING MEN AND AFFAIRS.

Mr. J. Obalski, who was one of the commissioners in charge of the Canadian exhibit at Liege, has returned to Quebec.

Mr. J. A. Clark, a mining engineer of Minneapolis, recently examined the Page-Holmes properties at Contact Bay, Ont.

Mr. H. W. Vance has been appointed superintendent of the mines at Windy Arm, Yukon, controlled by Mr. J. H. Conrad.

Mr. Armand Muscovice, who has been in Chibogamoo, as chemist and assayer for the Chibogamoo Mining Company, has returned to Montreal.

Mr. J. Graham, who formerly acted as assistant to Prof. Meyers, of Oxford University, recently joined the staff of McGill, as demonstrator in mineralogy.

In consequence of the retirement of Prof. Marshall, Prof. M. B. Carmichael and Mr. Manley Baker are now lecturing in physics at the Kingston School of Mines.

Mr. Felix Levick, of Leadville, Col., inspected during October the Tiger-Poorman group of claims, in the Fort Steele district of East Kootenay, on behalf of a Colorado syndicate.

Mr. D. W. McVicar, superintendent of the Last Chance Mine, near Phoenix, B.C., last month had the misfortune to fall down the shaft at the property, breaking his right leg and two ribs.

It is reported that operations are to be resumed at the Miocene Company's property, Harper's Camp, Cariboo, B.C., under the direction of Mr. R. H. Campbell, who is about to return to the district.

Messrs. Jas. McEvoy and O. L. Spencer, jr., of the staff of the Crow's Nest Pass Coal Company, have been engaged in examining the coal fields of the Similkameen and Nicola districts, British Columbia.

Mr. Springweller, of Buffalo, and Mr. Von Sich, of Toledo, Ohio, who are already largely interested in Canadian mining undertakings, have been visiting properties near Rat Portage with a view to investment there.

Mr. Oliver Wethered, Chairman of the London and British Columbia Gold Fields, has been spending some weeks in British Columbia inspecting the company's mines and other properties in which he has interest.

Some of the directors of the Crow's Nest Pass Coal Company, including Mr. Robert Jeffrey, Col. H. M. Pellatt and Messrs. C. E. Dalton, and T. Walmsley, during October paid a visit to the company's properties in East Kootenay.

Mr. W. H. Paul, a zinc specialist, of Denver, Colorado, has been visiting properties in the vicinity of Vancouver, alleged to contain zinc ores. It is said, however, that Mr. Paul has been disappointed with the results of his examination up to the present time.

Dr. A. E. Barlow and Mr. Jos. Keele, of the Geological Survey of Canada, were sent early in October on special duty to report on the zinc resources of British Columbia, doubtless to facilitate the work of the zinc commission now investigating in this field.

Mr. A. N. Mouat has been appointed General Manager of the Breckenridge-Lund Coal Co., Ltd., of Lundbreck, Alberta. The Company's coal lands are situated on the main line of the Crow's Nest Pass Railway, where a large plant has been installed and production is about to commence.

Messrs. J. G. Dixon (of Sheffield), and J. A. Peacock, (of Montreal), have been touring the mining districts of British Columbia. Mr. Dixon is very much pleased at what he has seen in the Similkameen and Coast districts, and will report accordingly to the British interests with which he is associated.

Dr. Robert Bell, Acting Director of the Geological Survey of Canada, has, during the past two months, been touring the districts of the Yukon and British Columbia,

and has accorded to the Western press numerous interviews relative to the work of the Survey and his work in connection therewith.

Mr. James Ross, President of the Dominion Coal Company, has returned to Canada after an absence of two months spent in Europe, where he visited many of the important British and Continental collieries. Mr. Ross states that the showing of the Company this year will be an exceptionally good one.

Mr. Alex. Hamfield, manager of the Thibert Creek Mining Company, has returned from Cassiar, B.C., and reports a satisfactory season's work, in spite of a shortage of water, due to an exceptionally dry season. Two other companies are installing a plant in this district, in readiness for next season's operating.

Mr. D. W. Moore, ore buyer for the Trail smelter, who has recently spent some time in the East visiting the Cobalt and other mining camps, left for British Columbia on Nov. 7th. It is satisfactory to learn that Mr. Moore has entirely recovered from a severe attack of blood-poisoning, and is now enjoying exceptionally good health.

At the session of the Tariff Commission in Victoria, Mr. C. H. Lugin, a barrister of that city, urged that the bounty on pig iron be extended on the grounds that this would result in the establishment of blast furnaces on Vancouver Island to utilize the local occurrences of magnetite which otherwise would be shipped to furnaces in Washington.

Mr. Angus A. Ferguson, who for the past nine months has been in the service of the Dominion Coal Company, has been appointed manager of the Cape Breton Coal, Iron & Railway Company's mine at Broughton. Upon leaving the Dominion No. 2, Mr. Ferguson was presented with a testimonial and address by the officials connected with this property.

The London Rialto remarks that Mr. A. J. McMillan is making a subtle bid for the sympathy of Le Roi shareholders by stating that if returned to power he is prepared to recommend the payment of a dividend for the year ending June 30th last. It looks as if there might be a very pretty contest, and meanwhile McMillan is increasing his holding in the company.

It has been largely due to the successful efforts of Mr. Mackenzie King, Deputy Minister of Labor, that the long-drawn out strike of the coal miners at the Nanaimo collieries, Vancouver Island, B.C., has at length been brought to a conclusion. This fact is recognized by the Western Fuel Company, whose manager, Mr. T. R. Stockett, has written an appreciative letter to Sir Wm. Mulock, in which he states that but for Mr. King's services there can be no doubt that the strike would have been continued for some considerable time longer.

Dr. Bonsall Porter, Professor of Mining Engineering at McGill University, who was a guest of the British Association during the recent summer meeting of that distinguished body in South Africa, returned to Montreal by the S. S. Virginian on Nov. 6th. Dr. Porter delivered a lecture, in response to a special invitation, on "The bearing of engineering upon mining, with special reference to mining education," at the time of the Association's visit to Kimberley, and since, the University of Good Hope has conferred on him the degree of Doctor of Science.

At the annual meeting of the Dominion Iron and Steel Company, the announcement of the retirement of Mr. Frederick Nichols, who for the past three years, has acted as Vice-President of the Company, was announced, his successor being the Hon. Senator L. J. Forget. Mr. Nicholls, who has devoted much time and attention to the affairs of the company without any remuneration, was tendered a hearty vote of thanks by the shareholders and was presented with a piece of plate by the directors. Mr. Graham Fraser has also retired as Director of Works.

In consequence of the retirement of Mr. Graham Fraser, Mr. F. P. Jones has been appointed general manager of the Dominion Iron & Steel Company. Mr. Jones



was appointed sales agent to the company in 1901, previous to which time he had been in the employ of the Nova Scotia Steel Company, first as Western sales agent, and subsequently as general sales agent. He is a man of wide experience, and his intimate knowledge of the iron and steel industry, and particularly of the Canadian and American markets, will stand the Company in good stead at this time.

Mr. W. Fleet Robertson, Provincial Mineralogist of British Columbia, returned during the month from visiting the Bulkley Valley in Northern British Columbia, where he has spent the summer months. In speaking of the mineral possibilities of the region, Mr. Robertson stated that there are undoubtedly some promising indications of ore, but in his opinion it is premature to form any conclusive judgment with regard to the extent of these deposits as the majority are locations of but a season or so standing. In the Telkwa, there are promising coal deposits, the beds being of very considerable thickness.

Mr. F. T. Hamshaw, a large operator in the Atlin district, states that the output of the district for the season is, at a reliable estimate, in the neighborhood of \$100,000 greater than that of last year. This increase is due in part to the extent of drift mining during the winter, for the past summer has been an exceptionally dry one. Mr. Hamshaw expressed the opinion that there would be shortly a consolidation of interests on McKee Creek by the two companies operating in that vicinity. These companies have proved the value of their ground to a distance of over three and a half miles, and propose to instal steam shovels and other additional plant.

Mr. R. B. Lamb has been appointed general manager and superintendent of the Daly Reduction Co., operating the Nickel Plate Mine at Hedley, B.C. Mr. Lamb is an Australian mining engineer, of considerable experience and standing. At a recent meeting of the shareholders of this company the following officers were elected: — President and treasurer, Mr. J. C. Lalor; vice-president, Mr. Marcus Daly; secretary, Mr. C. A. Crawford; assistant secretary, Mr. A. J. Campbell; the directors being as follows: Messrs. Marcus Daly and J. C. Lawlor, of New York; C. A. Crawford, of Anaconda, Mont.; J. G. Morony, Grand Falls, Mont., and A. J. Campbell, of Butte, Mont.

The British Columbia Department of Mines is taking steps towards securing much valuable information in regard to new mineral country, which is likely in the near future to receive considerable prominence. Thus the provincial mineralogist, Mr. W. F. Robertson, after spending the summer in the Bulkley Valley in Omineca, has now proceeded to Windy Arm, part of which territory, where recently rich quartz discoveries have been made, lies within the Province of British Columbia. Mr. Robertson, by the way, has received a handsome gold medal from the American Institute of Mining Engineers, in acknowledgment of his good offices in connection with the visit of the Institute to British Columbia in July last.

The 44th annual session of the Nova Scotia Institute of Science opened at Halifax on October 19th. The retiring president, Dr. Poole, delivered an interesting address, which was listened to with much attention. The following officers were elected for the ensuing year: President, Mr. F. W. W. Doane, C.E.; 1st Vice-President, Prof. E. MacKay, Ph.D.; 2nd Vice-President, Prof. J. F. Woodman, D.Sc.; Treasurer, Mr. W. McKerron; Cor. Secretary, Mr. A. H. MacKay, LL.D., F.R.S.C.; Rec. Secretary, Mr. Harry Piers; Librarian, Mr. H. Piers; other members of Council: Messrs. M. Bowman, B.A.; W. L. Bishop; E. Gilpin, jr., LL.D., F.R.S.C., I.S.O.; Alex. McKay, J. B. McCarthy, M.A., B.Sc.; Prof. T. H. Sexton, B.Sc.; Henry S. Poole, D.Sc, F.R.S.C.; Auditors, Messrs. D. A. Murray, Ph.D.; R. McColl, C.E.

In publishing last month a lengthy extract from a letter addressed by Mr. J. L. Retallack to Mr. Philip Argall, affording much interesting information on the subject of

the occurrence of zinc in British Columbia, we omitted to state that this letter was written in reply to a request made by Mr. Argall, and that it enclosed as authority a mass of correspondence from provincial government officials and others, and that on account of Mr. Retallack having decided not to accept the appointment on the Board, offered to him, the information was incomplete, but was published in order that those who had supplied him with the information in question might not consider him to have been neglectful of their interests.

A dispatch from Rossland states that Mr. J. M. Astley has retired from the management of the Le Roi mine, Mr. Astley had been in charge of operations at this mine since September, 1904.

### DOMINION GOVERNMENT BOUNTIES.

The official reports of bounties paid by the Dominion Government for the encouragement of the respective industries, for the year ending June 30th, have been published, the details of which are as follows:—

|                                 |              |                |
|---------------------------------|--------------|----------------|
| Pig iron .....                  | \$624,666 98 |                |
| Puddled bars .....              | 7,894 83     |                |
| Steel ingots .....              | 614,433 16   |                |
| Manufactures of steel .....     | 293,208 51   |                |
|                                 |              | \$1,540,203 48 |
| Lead .....                      | 233,844 53   |                |
| Lead exported for treatment ... | 96,800 59    |                |
|                                 |              | 330,645 12     |
| Binder twine .....              |              | 13,789 27      |
| Crude petroleum .....           |              | 350,047 17     |
| Total .....                     |              | \$2,234,685 04 |

This statement shows that \$250,000 more was paid during the period referred to than the year previous. This is shown in detail in the following comparative statement:

|                                                                                                                    | 1904-1905. | 1905-1906. |
|--------------------------------------------------------------------------------------------------------------------|------------|------------|
|                                                                                                                    | Per ton.   | Per ton.   |
| Pig iron made from Canadian ore .....                                                                              | \$2 25     | \$1 65     |
| Pig iron made from foreign ore .....                                                                               | 1 50       | 1 10       |
| Puddled bars .....                                                                                                 | 2 25       | 1 65       |
| Steel ingots .....                                                                                                 | 2 25       | 1 65       |
| Manufactures of steel:                                                                                             |            |            |
| Wire rods ....                                                                                                     | 6 00       | 6 00       |
| Rolled angles, tees, channels, beams, joists, girders, or bridge building or structural rolled sections, etc. .... | 3 00       | 3 00       |
| Rolled plates .....                                                                                                | 3 00       | 3 00       |

The other rates of bounty granted by the Government are as follows:

|                                                                       | Per ton. |
|-----------------------------------------------------------------------|----------|
| Lead smelted in Canada..                                              | \$15 00  |
| Lead exported to Europe for treatment .....                           | 10 00    |
| Crude petroleum produced from Canadian wells, 1 i-2c per gallon.      |          |
| Binder twine equal to export duty on Manila fiber, 75c per 100 kilos. |          |

### MINING STATISTICS.

The Government has received royalty on over seven million dollars' worth of gold produced in the Yukon this year.

The Klondyke's gold production to October 19 was \$7,086,000. The per capita output of the camp for the ten months of 1905 is about \$1,500.

Gold productions from the Yukon for the year is estimated at, approximately, six million dollars. Shipments until September 1st aggregated \$4,838,000.00, while, since then, the value of the gold send-out has been nearly a million dollars.

Coal shipments from Nova Scotia during the month of September were as follows:

Dominion Coal Co., Ltd.—

Output.....322,288 tons.

Shipments...299,403 tons.

Total shipments for 9 months ... .. 2,123,170 tons

Cumberland Railway Co.—

Shipments for September... 32,934 tons

Shipments for 9 months ... .. 294,725 "

Acadia Coal Company—

Shipments for September... 26,514 tons

Shipments for 9 months ... .. 189,085 "

Nova Scotia Steel & Coal Co.—

Shipments for September... 58,818 tons

Shipments for 9 months ... .. 398,095 "

Inverness Ry. & Coal Co.—

Shipments for September... 14,745 tons

Shipments for 9 months ... .. 94,702 "

Intercolonial Railway Co.—

Shipments for September... 19,755 tons

Shipments for 9 months ... .. 139,429 "

Total for 9 months, 1905... .. 3,239,206 tons

### COMPANY MEETINGS.

**Dominion Iron & Steel Company.**—The annual meeting of this company was held in Montreal on October 18th, the following statement being presented for the year ending May 31st:—

#### BALANCE SHEET—December 31st, 1904.

##### ASSETS.

|                                   |                 |
|-----------------------------------|-----------------|
| Property and Construction ....    | \$34,322,361.58 |
| Cash, Accounts receivable, etc .  | 498,647.71      |
| Raw Materials .....               | 602,187.85      |
| Manufactured Products .....       | 210,568.04      |
| Warehouse Materials .....         | 296,362.97      |
| Materials in Process, etc.....    | 156,119.59      |
| Insurance, etc., paid in advance. | 10,388.60       |

\$1,774,274.76

Special Deposits at Montreal .. 300,000.00

2,074,274.76

Profit and Loss Account, Debit

Balance ..... 1,093,240.82

\$37,490,077.16

##### LIABILITIES.

|                               |                |
|-------------------------------|----------------|
| First Mortgage Bonds .....    | \$7,876,000.00 |
| Second Mortgage Bonds .....   | 712,500.00     |
| C. B. Real Estate Bonds ..... | 70,000.12      |

\$8,658,500.12

Interest on First Mortgage Bonds due 2nd Jan'y, 1905

196,900.00

Interest Accrued on Second Mortgage Bonds .....

10,079.34

206,979.34

Bills Payable .....

2,899,320.62

Loans secured by subscriptions for 2nd Mortgage Bonds...

300,000.00

Accounts Payable .....

265,982.24

3,465,302.86

Sinking Fund First Mortgage

Bonds ..... 84,300.00

Relining and Replacement

Funds. ... 65,578.85

Suspense Account .....

9,415.99

159,294.84

\$12,490,077.16

Capital Account:

Common Stock .....\$20,000,000.00

Preferred Stock ..... 5,000,000.00

25,000,000.00

\$37,490,077.16

#### PROFIT AND LOSS ACCOUNT—December 31st, 1904.

Dr.

Balance brought forward, De-

cember 31st, 1903 .....

\$584,237.11

Interest on First Mortgage

Bonds ..... \$393,800.00

Interest on Second Mortgage

Bonds ..... 10,079.34

Interest on Current Loans ....

183,087.28

586,964.62

Sinking Fund First Mortgage

Bonds ..... 56,200.00

\$1,227,403.73

Cr.

Profit on Sales .....

\$124,755.36

Rents, etc. ....

9,407.55

134,162.91

Balance carried forward, De-

cember 31st, 1904. ....

1,093,240.82

\$1,227,403.73

#### BALANCE SHEET—May 31st, 1905.

##### ASSETS.

|                                               |                 |
|-----------------------------------------------|-----------------|
| Property and Construction ....                | \$34,703,463.02 |
| Cash, Accounts Receivable, etc.               | \$587,525.82    |
| Raw Materials .....                           | 371,206.20      |
| Manufactured Product .....                    | 330,232.33      |
| Warehouse Materials .....                     | 251,276.79      |
| Materials in Process, etc. ....               | 212,821.80      |
| Taxes, Insurance, etc., paid in advance ..... | 27,471.77       |

1,780,534.71

Special Deposits at Montreal... 528,118.49

2,309,353.20

Profit and Loss Account, Debit

Balance ..... 1,021,708.75

\$38,036,524.07

##### LIABILITIES.

|                               |                |
|-------------------------------|----------------|
| First Mortgage Bonds .....    | \$7,876,000.00 |
| Second Mortgage Bonds .....   | 1,631,500.00   |
| C. B. Real Estate Bonds ..... | 65,833.47      |

\$ 0.573,333.47

Interest Accrued on First Mortgage Bonds .....

164,083.34

Interest Accrued on Second Mortgage Bonds .....

16,607.60

180,690.94

Bills Payable .....

2,873,222.01

Accounts Payable .....

215,491.49

3,088,713.50

Sinking Fund ..... 107,716.66

Relining and Replacement

Funds ..... 86,070.40

193,787.06

\$13,036,524.07

Capital Account — Common

Stock. .... 20,000,000.00

Preferred Stock ..... 5,000,000.00

25,000,000.00

\$38,036,524.07



## PROFIT AND LOSS ACCOUNT—May 31st, 1905.

Dr.

|                                                |                       |
|------------------------------------------------|-----------------------|
| Balance brought forward, Dec. 31st, 1904 ..... | \$ 1,093,240.82       |
| Interest on First Mortgage Bonds. ....         | \$ 164,083.34         |
| Interest on Second Mortgage Bonds. ....        | 30,779.09             |
| Interest on Current Loans ....                 | 81,048.16             |
|                                                | 275,910.59            |
| Sinking Fund, First Mortgage Bonds .....       | 23,416.66             |
|                                                | <u>\$1,392,568.07</u> |

Cr.

|                                                      |                        |
|------------------------------------------------------|------------------------|
| Profit on Sales, January 1st to May 31st, 1905. .... | \$366,062.90           |
| Rents, etc. ....                                     | 4,796.42               |
|                                                      | 370,859.32             |
| Balance carried forward .....                        | 1,021,708.75           |
|                                                      | <u>\$ 1,392,568.07</u> |

Since the last annual meeting arrangements have been made to dispose of the remainder of the second mortgage bonds authorized by the shareholders. The total issue is \$2,500,000, of which \$2,000,000 have now been sold. \$100,000 of the bonds which would fall due on 1st of October, 1905, were cancelled without being issued, and \$150,000 of those already issued, maturing on the same date, will be duly met. The price realized for the whole amount averaged 90 5-8 and accrued interest.

The entire proceeds will be devoted to the improvement and completion of the plant. The chief matters in this connection now under progress are the coke ovens mentioned by the director of works in his report last year; the enlargement of the electric power plant, to provide for the additional burden put upon it by the rail mill and additional coke ovens; the improvement of the open hearth plant; and the installation at Wabana of the machinery requisite for underground mining.

The directors have pleasure in reporting that the rail mill was completed and started up on June 14. It has proved satisfactory in every respect, and although, as might be expected, some delays were experienced in getting it into full operation, these have been largely overcome. The capacity of the mill is fully up to the estimate of 500 tons in each shift, and the expectations as to the high quality of the rails to be produced have been entirely fulfilled.

The directors are glad to be able to submit a statement showing that in the first five months of 1905, the earnings of the company fully provided for the fixed charges and sinking fund. Apart from interest on the floating debt, the annual charges to be borne are as follows:—

|                                                                                        |                  |
|----------------------------------------------------------------------------------------|------------------|
| Interest and sinking fund, first mortgage bonds.                                       | \$450,000        |
| Interest on second mortgage bonds, after 1st October, 1905, (lessening annually) ..... | 135,000          |
| Redemption of second mortgage bonds, 10 per cent. annually. ....                       | 250,000          |
|                                                                                        | <u>\$835,000</u> |

The company's output will be considerably increased at an early date by a third blast furnace being brought into operation, and the tonnage of steel will, it is hoped, be enlarged by the improvements in the open hearth department. With this increased production, with the full and profitable outlet which the rail mill and rod mill afford for the whole output of steel, and with the existing promising outlook for business your directors are very hopeful that the company's affairs will now show continued and satisfactory improvements.

The directors regret to announce that in accordance with the understanding on which he accepted the office of director of works, Mr. Graham Fraser desires to be relieved from further service at an early date. They feel that the improved prospects of the plant are largely due to his sound practical management, and they especially wish to record their appreciation of the excellent work he has done in two important undertakings entered on under his supervision, namely, the erection of the coal washing plant and of the rail mill.

**Lake Superior Corporation.**—As already reported in the Mining Review, this company held its annual meeting on Oct. 4th, at Jersey City, N.J. The directors reported as follows:—

To properly appreciate the situation and the results, it is necessary to recall that your properties were received in June, 1904, after a long period of idleness with its attendant demoralizing and accumulating disadvantages. They were also hampered by litigation and complications resulting from the most unfortunate condition of the old company. This was so serious, that had it not been for the persistent and heroic efforts of a few men, many of the creditors, and the stockholders of the Consolidated Lake Superior Company would have suffered almost a total loss of their claims and investments.

After a reorganization was made possible, much time was consumed in extricating the properties by the legal procedure necessary to complete the transfer of title, and to give unrestricted possession.

The last Canadian property to remain in the receiver's hands, The Lake Superior Power, has been released by the discharge of the receiver, and has passed into the full control of the corporation within the past few days.

The inevitable costs and legal fees, etc., in connection with all these matters were very large, but you will be pleased to know that these expenses were special and will not be again incurred.

The allotment of the stock and bonds of the corporation to underwriters and to participating stockholders in exchange for assessment certificates, was quite a complicated matter, and fractional shares and bonds were found to be due almost every individual. The scrip to represent these fractions was undesirable for the investor. A plan for the equitable conversion of the fractional shares and bonds was devised which rendered the issue of scrip unnecessary. This was a relief to the shareholders and a saving of expense.

The distribution of the new securities to underwriters has been completed; and only a small percentage of the securities due to shareholders remains to be issued.

The expenditure was heavy both in time and money in putting such an extensive plant in full operation after a long period of inactivity, with scarcely more than one plant (The Grand Wood Pulp Mill) in condition for operation.

Under these conditions, profitable operations could not be established before the closing half of the year, and thus profits were depleted by expense absolutely necessary to restore working conditions.

The difficulties of the situation were increased late in October, 1904, by the sudden death of the first general manager, Mr. Cornelius Shields.

This serious emergency was soon happily relieved by the engagement of Mr. Willard N. Sawyer, the present general manager, a gentleman of large experience, whose ability and qualifications have met the expectation of your Board.

It is matter for congratulation that following a combination of such conditions and circumstances, the aggregate net income of the plants operated, is in excess of the fixed charges of the corporation.

The old indebtedness has been practically all settled, with the exception of a few disputed claims, and a number of small accounts. When these are all settled, the balance of the treasury bonds for the uses of the corporation will probably be a little over one million dollars.



Under the wise provision of the plan of reorganization, your corporation received one million dollars in cash as working capital, which was in addition to the material and supplies held by the subsidiary companies.

This sum, large in itself, was soon found to be inadequate for the requirements of the business, and it has been necessary to have recourse to loans in order to provide for the advantageous purchase and accumulation of stock and materials required by the subsidiary companies for continuous operation.

Plans have been considered for extensions and additions to the plant, which will materially increase the earning capacity, but lack of ready moneys for this purpose has prevented action being taken beyond a very limited extent, and on lines of extreme urgency. It is expected that this hindrance will be removed during the current fiscal year by the disposition of treasury bonds, and by the sale of nickel matte and ore on hand, and from the increasing net earnings of the current year.

The maximum monthly output of the rail mill was 12,138 tons. Under the efficient direction of the management the product of the mill is of a very high grade, fully meeting the extreme requirements of the Canadian Railways.

The rail mill, in point of appliances for economical handling of material is most efficiently equipped.

The two blast furnaces produced 11,997 tons of pig iron during the month of August, 1905.

Negotiations are pending with experienced parties with a view to deriving a satisfactory revenue from the **nickel properties**.

Over 200,000 tons of ore were taken out at the Helen Mine, and this, together with the stock on hand, and the output to the close of the shipping season this year, has been sold.

The woods operations for the year have not resulted satisfactorily owing to the large dues payable to the Government, and to other matters incident to this work.

A new arrangement has recently been consummated with the Government, which will make more profitable operations possible, and it is believed that the woods department will hereafter show fair earnings.

The saw mill has been kept running profitably with our own logs and custom work.

The pulp mill produced 27,817 tons of ground wood pulp during the year, which is the largest output in its history.

Building paper and tar paper are also being made in increasing quantity, and will augment the income of this department.

The Algoma Central & Hudson Bay Railway, and the M. nitoulin & North Shore Railway, and the fleet of steamers have been operated profitably mostly in carrying company's freight.

The two traction companies at the Canadian and Michigan "Soos" show a loss for the year. The traffic is increasing, however, and it is expected will show better results the coming year.

The Tagona Water & Light Company with a business of comparatively small volume is one of the best properties, in proportion to the investment.

It has been a matter of serious concern that the great power house of the Michigan Lake Superior Power Company, 1,368 feet long, is unable to bear safely the strain of the full head of water required to develop the maximum horse power; and the works necessary to make its security beyond question, upon the estimates of experienced engineers, will cost an amount beyond the present resources of your corporation.

An agreement, however, has been reached between the bondholders' committee representing the owners of the first mortgaged bonds of the Michigan Lake Superior Power Company, and the officers of your corporation, by which it will be possible to secure the amount required for the construction of the necessary work to place the power house in a satisfactory condition.

This work will require several months and can be undertaken as soon as weather conditions permit next spring.

In the meantime power will continue to be furnished up to the limits of safety, under the contract with the Union Carbide Company, and for other purposes, and your corporation expects to be in a position to entertain applications for the sale of power early in 1907.

In concluding this review, it is proper to state that the manufactured goods on hand, June 30, 1905, such as ore, rails, etc., while sold and under contract at profitable figures, were inventoried at cost, the benefit from which will be realized in the current year's earnings.

The outlook for the current year, viewed conservatively, is most encouraging. Barring unforeseen accidents, the output of rails with the present equipment should be 150,000 tons, 50 per cent. increase upon the production of last year, and at reduced cost, because of some new appliances now being installed.

The two furnaces should produce this year nearly the amount of iron required for the present capacity of the rail plant, whereas last year it was necessary to purchase 50,000 tons of pig iron.

The Directors feel that the shareholders of the Consolidated Lake Superior Company are under obligations to the Province of Ontario for the very substantial assistance which that Government gave to the re-organization in the form of a guarantee upon a loan to the amount of two million dollars, and to some of the bankers holding the loan against the Consolidated Lake Superior Company, who also assisted in redeeming the property from its debts by offering financial assistance to the Underwriting Company.

The disposition of the Canadian Government and people to foster and protect home industries, particularly those which are developing the mineral resources of the Dominion, has been generously manifested towards this enterprise. This friendly spirit and assistance are appreciated and give courage and confidence to extend and enlarge the subsidiary companies' operations.

Cordial and hearty thanks are extended on your behalf to a great body of faithful employees, for most loyal and efficient service, and to those who have ably supervised and directed the work of the year.

Finally, the present and prospective favorable conditions of all markets are too well known to need comment, and with the plants now in operation, running a full year, you may have confidence that the results to be shown at the close of the current fiscal year will be fairly commensurate with the normal operations and healthy growth of a great and developing business.

**Providence Mining Company (B. C.)** — The third annual meeting of this company was held at Greenwood on October 24th. The superintendent, Mr. P. J. Dermody, reported that when he took over the management of the mine on the 30th of September last he found the property to be in a very poor condition. All the available ore was on the 300 foot level, and was 43 feet long, 12 feet high and 6 inches in thickness. This was stoped out and shipped. A considerable amount of development work has since been done and the mine at present is in a much improved state, while a new boiler and air compressor plant has been installed. Mr. Dermody recommends the installation of a complete electric plant, including shaft house, drying room and office building, at an estimated cost of \$30,000. Owing to the disagreement between the directors of the company, the mine was only running seven months of the eleven months covered by the report. The balance sheet shows an excess of assets over liabilities of \$42,296.24, the net gain for the year ending September 30th, 1905, being \$19,034.76. During the past year the mine shipped 657 tons of ore, which yielded \$61,919.54. The cost of mining was \$19.83 per ton, and the cost of hauling, assaying, freight and treatment, \$10.71 per ton.



**Granby Consolidated Mining, Smelting & Power Co., Ltd.**—The Directors report as follows: Although a large tonnage of ore was treated, the production of copper bullion during the year shows a slight falling off, due entirely to the fact that no outside mattes were purchased for treatment. Nevertheless, the profit—\$712,649.26—is considerably larger than last year, owing partly to great economies introduced during the year and partly to better average prices for metals. It is especially interesting to note that by far the larger proportion of the profits was earned during the last few months of the fiscal year.

In March last, the new line of the Great Northern Railroad Company, connecting the smelter at Grand Forks with the mines at Phoenix, was completed, and since that time ore shipments have been received by both the Great Northern and Canadian Pacific Railroad companies.

In the Phoenix Camp, the company has, during the year, materially increased its holdings by acquiring there, by purchase, the Monarch Group, the Marshall Group, and the Missing Link; and after the first of July, the Gold Drop claims, all adjoining the mining properties of the company in the Phoenix Camp. These acquisitions will facilitate the working of the mines owned by the company in the past, and, with the ore reserves on hand, will satisfy the largely increased demand of the smelter for raw material for a long time to come.

It was decided last winter to add two blast furnaces to the six then in existence, thus increasing the smelting plant at Grand Forks to eight blast furnaces, and it was hoped that they would be in commission by mid-summer of the current year. A number of unforeseen contingencies, however, caused considerable delay, with the result that the seventh furnace was not blown in until October 3rd and the eighth is expected to be in commission by the 16th inst. Consequently, no benefit was derived during the last fiscal year from the operation of the two additional furnaces.

These extensions and improvements necessitated a large outlay of money. It was found necessary to widen the tunnels, equip them with the same electric locomotive haulage system and provide new 10-ton steel ore cars. Besides, a new crushing plant had to be erected and new ore bins installed in order to facilitate the shipment of ore over the Great Northern. At the smelter, in addition to the new furnaces, a new blowing engine and accessory machinery, as well as new ore bins had to be erected. The method of handling the slag from the blast furnaces was changed, as also the method of charging the furnaces into a new and better system, both of which are now in operation and have materially lessened costs. These improvements entailed an outlay of about \$350,000 in the past year, and additional sums will be required during the current fiscal year.

The mines, at which development work is constantly pushed, look well; the quantity of ore blocked out is largely in excess of that in sight last year. The smelting works, thanks to the improvements recently introduced, are in a high state of efficiency. The company is entirely free from debt, and in addition to a large cash balance on hand, has further available assets in the shape of blister copper in transit from the smelter to the refining works.

#### Treasurer's Report.

Following is a summary of the years' business:  
Produced.

14,237,622 lbs. copper fine, sold at an average price of .....\$0.1436  
212,180 ozs. silver fine, sold at an average price of ..... 0.5830  
42,884 ozs. gold fine, sold at an average price of .....20.00

These prices are net after all expenses have been deducted.

The total amount realized equals ... ..\$2,749,145.02

#### Costs.

|                                                                                                              |                |
|--------------------------------------------------------------------------------------------------------------|----------------|
| Working expenses at mines and smelter, freight, refining, selling, and general expenses....                  | \$1,797,964.35 |
| Foreign ores purchased ... ..                                                                                | 238,531.41     |
|                                                                                                              | <hr/>          |
|                                                                                                              | \$2,036,495.76 |
| Net profit for the year ending                                                                               |                |
| June 30, 1905 .....                                                                                          | 712,649.26     |
| Surplus from previous year (corrected) .....                                                                 | 842,226.01     |
|                                                                                                              | <hr/>          |
| Net surplus June 30, 1905 ... ..                                                                             | \$1,554,875.27 |
| There has been expended in new construction, equipment at the mines, smelter and converter plants, etc. .... | \$ 343,974.28  |
| For additional mining properties as above enumerated .....                                                   | 142,603.53     |
|                                                                                                              | <hr/>          |
|                                                                                                              | \$486,577.81   |

All development work, renewals and repairs have been charged to working expenses.

|                                 |                   |
|---------------------------------|-------------------|
| Mine Development .....          | 5,200 lineal feet |
| Diamond Drill Development ..... | 3,148 lineal feet |
| Granby Ore Smelted .....        | 550,738 dry tons  |
| Foreign Ore Smelted .....       | 59,382 dry tons   |

#### Assets and Liabilities.

June 30, 1905.

##### Assets.

|                                                                                |                 |
|--------------------------------------------------------------------------------|-----------------|
| Cost of land, real estate, machinery, buildings, dwellings and equipment ..... | \$14,451,565.39 |
| Stocks, bonds and bills receivable ... ..                                      | 45,545.17       |
| Cash, copper in transit and on hand, less advances, ... ..                     | 584,113.35      |
| Fuel and store supplies .....                                                  | 158,345.83      |
|                                                                                | <hr/>           |
|                                                                                | \$15,239,570.74 |

##### Liabilities.

|                                                |                 |
|------------------------------------------------|-----------------|
| Capital stock .....                            | \$15,000,000.00 |
| In the treasury .....                          | 1,500,000.00    |
|                                                | <hr/>           |
| Issued stock .....                             | \$13,500,000.00 |
| Accounts payable (current for month) ... ..    | 184,490.27      |
| Dividends collected on liquidator shares ..... | 205.20          |
| Surplus .....                                  | 1,554,875.27    |
|                                                | <hr/>           |
|                                                | \$15,239,570.74 |

**Shakespeare Gold Mining Company (Ontario).**—A meeting of the shareholders of the Shakespeare Gold Mining Company was held during October, when the following directors were elected: Mr. C. L. Twohy, president; Duluth, Minn.; Messrs. Andrew Gowan, Duluth, Minn.; A. L. Hoffman, Brainerd, Minn.; J. C. Foley, Sault, Ont.; J. B. Miller, Sault, Ont.; J. W. Trotter, Sault, Ont.; F. R. Price, Soo, Mich.

#### COAL NOTES.

##### NOVA SCOTIA.

The Dominion Coal Company, which have been making a number of improvements during the past summer, have decided to substitute electricity in place of steam in the respective collieries.

The Nova Scotia Collieries Co., composed of English capitalists who have acquired extensive coal areas at St. Rose, N.S., (the old Chimney Corner location) has had engineers in the field for the past month making a preliminary survey for a line of railroad from its holdings to Port Malcolm, on Caribou Cove. The proposed line will probably connect with the I.C. Ry. at Orangedale.

The work of excavating for the new foundry to be erected at Glace Bay by the Dominion Coal Company has been commenced. The building will be ninety by one hundred feet long, about twice the size of the present foundry. It will be of brick and steel, and will cost over \$25,000. It is expected that the building will be completed inside of three months. The capacity will be ten tons per day. The output at the big colliery, Dominion No. 2, will this month be the largest in its history. Some days the output has run up to 3,900 tons per day on single shifts.

The coming winter promises to be the brightest ever experienced in the coal trade in Nova Scotia. Commencing this month, the quantity of coal supplied to the Dominion Steel Co. has increased from 40,000 to 60,000 tons per month. The contract with the Maine Central Railway calls for 75,000 tons for winter shipment. Louisburg, the winter port of shipment of the Dominion Coal Co., will have the busiest season in its history. The Dominion Coal Co. have erected immense coal pockets at St. John and at Halifax, which are now nearly completed. Thus increased steamship traffic will be readily supplied, as well as the local trade of the provincial towns and cities. The time is not far distant when Nova Scotia will utilize two million tons of coal per year. The coal pocket structure at St. John measures 200 feet long, 36 feet wide, and 56 feet high from the wharf line. The pocket will have a capacity of 5,000 tons, and by the utilization of up-to-date machinery the average vessel will be emptied in ten hours, at a cost of three-quarters of a cent per ton. Eight hundred thousand tons of coal will be required of the Dominion Coal Co. between January 1 and April 1. This means steady work throughout the winter.

#### BRITISH COLUMBIA.

The output from the Comox collieries is being steadily increased, and it is expected that the monthly production will aggregate 40,000 tons.

Development operations have commenced on the recently discovered coal deposits near Enderby, in which it is said Sir Arthur Stepney, who is a large proprietor in other British Columbia properties, has secured a considerable interest.

After a period of idleness of nearly five months the Nanaimo collieries were re-opened during October. The mines were found to contain a considerable quantity of water, but were free from gas, and by the beginning of November were working at full capacity.

The Vermilion Forks Mining Company is operating a steam drill on one of the company's properties on the Tulameen, and a seam of good coal, four feet in thickness, has been reached. Arrangements are to be made for the commencement of active mining operations, and a shipment of coal to the Daly Reduction Company, at Hedley, is shortly to be made.

#### MINING NOTES.

##### NOVA SCOTIA.

A promising new discovery of gold quartz is reported to have been made near Cross Roads, Country Harbour. The property is now being developed.

The Dominion Iron & Steel Company's new rail mill is in steady operation, and last month completed the Grand Trunk Railway Company's order for 25,000 tons. The capacity of the mill is 1,000 tons a day, though the daily production is about 600 tons.

We are informed that the Dominion Antimony Co., owning extensive deposits of antimony ore at West Gore, N.S., have contracted with a representative of the McArthur-Forest Company, for the erection of a plant for the extraction of the gold which is associated with antimony at the mine. This report states that the plant is to cost \$75,000.

A large addition is being made to the coal-washing equipment of the Dominion Iron and Steel Company in the form of a trestle, pockets and conveyors for taking care of the storage of fifteen thousand tons of coal. The work is being done, by a Pittsburg firm. The rest of the washing plant has been definitely taken over by the Steel Company, and it is expected that the first section of the new work will be finished by Christmas.

The Dominion Iron & Steel Company are contemplating an enlargement of the plant, but are at present undecided whether to build more open-hearth furnaces or install a Bessemerizing plant for de-siliconizing the pig. The company is arranging with the Nova Scotia Steel Co. for the exploration of the submarine areas at Wabana. The Nova Scotia Co. owns areas lying outside those of the Dominion Company, and a slope will be driven down through their present workings, which, it is hoped, will prove the existence of large and valuable ore bodies in the area of both companies.

#### QUEBEC.

The Trans-Canada Railway Company have already completed their survey of 30 miles along the proposed route of the extension of this line from Roberval into the Chibogamoo country, and it is expected that construction will be commenced at an early date.

#### ONTARIO.

The Ogden Oil Company is sinking a new well on the Dick farm, lot 14, 9th concession, at Leamington.

The B. A. Pyrite mine at Queensboro is now making steady shipments of ore. The new testing mill is now completed and the machinery installed.

Another important strike of oil is reported to have been made in Essex, at a well being sunk by a Marmora company, which holds a large tract of land near Leamington.

Arrangements, it is hoped, will be made to continue milling operations at the Camp Bay mill during the winter. A clean-up at this property was recently made, with satisfactory results.

The Manitou Mining Company, a new organization, proposes to commence development operations on the H. P. 413, H. W. 36 and H. W. 37 properties, situated near the Big Master mine in the Manitou district, early next spring.

The Lake Superior Corporation has resumed operations on the Josephine iron mine, under the direction of the Company's metallurgist, Mr. A. B. Willmott. The re-opening of this company was announced some time ago by the directors.

Another gusher is reported to have been struck, at a depth of 1,080 feet, in the Leamington oil fields. This is the fourth large gusher that has been tapped in the last two weeks. The well is located on the east half of lot 10, in the 7th concession of Mersea.

The development of the Garden Plough mine is proceeding satisfactorily, and the mill test, recently conducted by Mr. C. Brent at the Eldorado mill, proved very satisfactory. Operations have meanwhile been resumed at the Eldorado mine, which is now being unwatered. A stamp mill is also being installed at the Grace.

The mill at the Big Master mine is now steadily crushing ore, and as a result, of 23 days' operations, bullion was produced said to be valued at \$3,000, from a crushing of 450 tons. At the mine the shaft has been sunk to a depth of some 300 feet, and a cross cut is being run to the main vein. It is reported that the company contemplate the installation of a cyanide plant.



The clean-up at the mill of the Anthony Reef mine at Sturgeon Lake, resulted in the production of a gold brick valued at \$8,000. Milling operations have been discontinued for the present, to enable certain repairs to be made to the mill foundations. Arrangements are being made with a view to the resumption of operations of the Grace Gold Mine, Michipicoten. This property was previously on a profit-earning footing. It is also expected that the Mariposa property in the same locality will be re-opened in the near future.

The Leamington Oil & Gas Company has declared another dividend of 6 per cent. The Leamington News states that the production of the Leamington Oil Co. from three wells on the Grant farm for September was 1,066 barrels. On the Rymal farm the production for the month was 622 barrels. Five wells on the Foster farm yielded for the same company 693 barrels, and those on the Gowman farm produced 714 barrels. Their total production for the month of wells as reported above was 3,095 barrels. This, of course, does not include the company's output on leases north.

During the past summer a considerable amount of development work has been carried on at the Hermina mine, in the Algoma district, under the superintendence of Capt. William Daniells, who assumed charge of the property in May last. At the No. 1, 2-compartment shaft sinking has been continued to a depth of rather more than 300 feet, and drifts extended from the 2nd and 3rd levels. This work has resulted in opening up a considerable quantity of ore. At the No. 3 shaft, on the No. 3 vein, a hoisting engine, capable of operating to a depth of 2,000 feet, an 8 drill compressor and other plant, has been installed. This shaft is a 3-compartment, and sinking was commenced towards the close of September.

The Iron Age, in a recent issue, published an account of the record of No. 1 blast furnace of the Algoma Steel Company in the production of charcoal pig iron at Sault Ste. Marie. On July 8, 1905, the output was 173 gross tons, and the average for four days ending July 9 was 163 tons. Charcoal consumption was 1,471 pounds per ton of pig iron; the pressure of the blast was 9 1-4 pounds; and the volume of air 10,172 cubic feet per minute. The furnace was built to use charcoal as fuel but since the middle of July it has been running on coke. No change whatever was made in the construction or connections of the furnace in going from charcoal to coke, except the necessary increase in the amount of blast blown. For one week the experiment of part coke and part charcoal was tried with good results. The product was only a little higher than on all charcoal, 175 tons being the best day's output. The best week's product on all coke was 1,372 tons, or a daily average of 196 tons. This is at the rate of 224 tons per week per 1,000 cubic feet capacity. The furnace is only 70 feet by 13 feet six inches bosh diameter by eight feet six inches hearth. The best day's product was 216 tons,

#### ALBERTA.

A dispatch received at the local offices of the Western Oil & Coal Co., Ltd., from its works in the Alberta oil fields, states that the boring machine is now down almost 1,200 feet and that gas is issuing from the bore in sufficient quantity to give a flame six feet high when a light is applied. In the last 100 feet a softer formation has been entered and the oil has been seeping into the bore freely. The officers of the company express pleasure at the news of the softer formation as oil is never struck in the harder rocks.

#### BRITISH COLUMBIA.

Atlin.—Operations on McKee Creek have been suspended for the season. One of the principal companies operating on this creek is the McKee Creek Mining Company, which, during the summer, cleaned 5,700 square yards of bed rock covering gold to the value of \$34,000.00, at a profit of \$12,000.00, notwithstanding the scarcity of

water during the summer months. The company proposes installing electric shovels for handling the dirt more expeditiously next season.

The season in Atlin has practically closed, although some of the large undertakings are still working. The season is said to have been an exceptionally successful one, and good reports have been received of dredging operations. There is some talk of a likelihood of an amalgamation of interests on McKee Creek, by the two companies operating there. The British American Dredging Company meanwhile are said to be arranging for the purchase of another large dredge from the manufacturers in San Francisco, while dredging operations are said to have yielded good returns. A large steam shovel plant is also, it is expected, to be installed next season, to handle 350 yards of material daily. During the year important developments are said to have taken place on Ruby Creek, which, it is believed, will prove a very rich area.

Coast.—The Western Iron Co. has been floated with a capital of half a million dollars, to construct a large blast furnace at or near Seattle for the handling of iron ore, presumably from the mines recently purchased by the company organized by Messrs. Moore and Pigott on Quatsino Sound.

The Victoria Colonist reports that a million dollars has been guaranteed to provide for the erection of a blast furnace of 300 tons capacity on Puget Sound, to utilize the Vancouver Island iron ores.

Shipments of ore have commenced from the Copper Queen mine, on Texada Island, to the Crofton smelter, while pumping machinery has been installed at the Cornell, where the workings are being unwatered.

The reports from the Mount Sicker district indicate that mining in that section is at present extremely active, largely as the result of the arrangements to re-open the Crofton Smelter, the installation of new machinery and the erection of a briquetting plant. A force of men are also at work overhauling the smelter plant and rearranging the tracks. Ore is already being roasted in the yards.

Cariboo District.—A company known as the Beaver Valley Oil Company has been incorporated with a capital of \$100,000, to prospect for oil in the Beaver Valley, Horse Fly district.

Mr. Frank Hibl kindly sends us the following notes:

The Lightning Creek Gold Gravels and Drainage Company has successfully concluded its drilling operations for this season.

"Since the location of the ancient channel has been positively ascertained, its depth, width and direction have since been more extensively explored and determined by three additional drill holes, No. 8 drill hole proved the same depth to bed rock as No. 5, where such prodigious values were recovered and equally as rich.

"A new flume treble the size of the former is about to be completed, which will carry sufficient water to develop 75 horse power.

"A new shaft house is in course of construction and as soon as it is completed the sinking of a three compartment shaft about 75 feet from the point where the old channel was discovered, will be commenced.

"Supt. Sam. Keast, who so successfully conducted operations during the past summer, will in the near future make a business trip to Vancouver and Victoria to select the necessary machinery, such as steam hoist, dynamo, pumps, turbine water wheels, and other requisite supplies to the end of prosecuting a vigorous system of development of this promising proposition. Much credit is due to Mr. Keast's untiring efforts and ability in what has been accomplished since the beginning of operation last spring.

"In all, the company has an exceedingly bright future, its location at Wing Dam on the Cariboo Road has every appearance of a busy camp."

Mr. R. T. Ward proposes installing a dredging plant on his property at Harper's Camp, and has worked a No. 3 Keystone drill in order to first test the ground.



Arrangements for the sale of the Consolidated Cariboo Hydraulic Mining Company's property, it is unofficially announced, to Messrs. Guggenheim and others, have been completed, following the lines mentioned in the Mining Review last spring.

**Lardeau.**—Last month's clean-up from the Oyster-Criterion gave a net result of \$6,000.

At the Silver Dollar mine, at Camborne, machinery for a more extensive working of the property has been installed.

The Lardeau Mining Review speaks very hopefully of this summer's development operations at the Silver Cup mine, good ore having been encountered at a depth of 700 feet on the property.

The Great Northern Mines, Limited, at a general meeting of the company, has decided to raise \$10,000 by mortgage to liquidate an immediate indebtedness, and, in addition, issue debentures to the value of \$200,000, of which \$60,000 has already been subscribed, to provide for the purchase of mining machinery and mine development.

Last month's clean-up at the Eva mill resulted in the production of a gold brick valued at \$5,000 besides which there are concentrates of an approximate value of \$1,000, making the gross output for the month's work, \$6,000, says the Camborne Miner. After paying all expenses of operating a good margin will be left on the right side of the ledger, which is a creditable performance for a ten stamp mill.

**Slocan.**—A despatch from Nelson dated Nov. 6th states: A dividend of \$25,000, equal to 5 per cent. on the capitalization of the company, has been declared by the Slocan Star Mining and Milling Company, operating the Slocan Star mine at Sandon.

A decision has been reached to continue development work at the La France mine during the winter.

Mr. S. S. Fowler has obtained from the London B. C. Gold Fields a renewal of his lease on the White Water mines on favorable terms.

The owners of the Lucky Jim divided profits amounting to \$24,000 in October. The mine has been in operation for rather over a year, and during that period has paid \$80,000. The ore carries values chiefly in zinc, which has been shipped to Colorado smelters.

**Nelson.**—It is stated that a new and comprehensive plan for the development of the Ymir mine, is now under consideration.

**Rosslund.**—The Department of Trade and Commerce has been notified that the lead refinery, operated in connection with the smelting works at Trail, has been enlarged to enable a product of 50 tons per diem.

A 400 h.p. electric motor has been shipped from Montreal to the White Bear Mining Company.

The Rosslund output to the end of October is 275,663 tons, of which the Le Roi contributed rather over 100,000 tons, the Centre Star 83,000 tons, and the War Eagle 56,500 tons.

On September 27th the Le Roi No. 2 Company declared an interim dividend of one shilling per share. This Company has, it is reported, obtained the consent of the Le Roi Company to run a drift from the 1,550 ft. level into the Josie ground, in order to admit of prospecting work at that depth. The Rosslund Miner remarks that by this means a large saving will be effected. Should the ore shoots be found, as it is expected they will be, on the 1550 foot level in the Le Roi Two, either the main shaft can be extended down to them or the ore can be extracted and taken out through the Le Roi workings. It is certainly the cheapest method of getting at the ore in the Josie, and whether the ore is found or not the expenses of running a crosscut and drifts for the purpose of ascertaining the fact will not be very great.

**Boundary.**—At the British Copper Company's Mother Lode mine preparations are in progress for sinking the main working shaft to the 500 foot level, exploration by diamond drilling having justified the expenditure in this district.

Shipments from the Boundary Creek district, British Columbia, for the year to the end of October, are given as 731,277 tons, of which over 500,000 tons have been produced by the Granby mines and 160,000 by the B. C. Copper Co.

The Dominion Copper Company has contracted with the Cascade Power Company for 100 h.p., for the purpose of operating the company's plant at Phoenix. The Dominion Copper Company meanwhile proposes to install a larger and more complete compressor plant at the Brooklyn mine.

The Granby Company is now employing between 900 and 1,000 men at the mine and smelter. The new furnace, recently blown in, is said meanwhile to be giving excellent results, the daily treatment of ore being 450 tons. The smelter is in consequence treating in excess of 2,000 tons of ore in 24 hours.

A deputation of smelter employees recently waited upon Mr. Hodges, the company's general manager, and urged that their hours be reduced to 8 hour shifts instead of as at present 12 hours. The request will be laid before the directors, but it is understood that Mr. Hodges is not unfavorably disposed in the matter.

**Similkameen.**—Mr. M. K. Rogers, manager of the Nickel Plate mine, states that it is the intention to increase the capacity of the Nickel Plate mill from 40 to 120 stamps directly the railway, now under construction, shall have reached Hedley.

**East Kootenay.**—The St. Eugene Mining Company paid a dividend on the 4th of October, of 2 per cent., for the quarter ending June 30th.

On October 6th the shaft house and machinery at the St. Eugene mine was totally destroyed by fire, the damage being estimated at \$25,000, the insurance being only \$8,000. The origin of the fire is believed to have been due to the work of incendiaries. No time, however, has been lost in repairing the damage, and new machinery was immediately ordered. It became necessary, however, to close down the mill temporarily, but development at the mine has been continued. Some considerable inconvenience, however, will be occasioned by the suspension of shipments to the smelters, but a recent dispatch states that production will be resumed by the first of December, which is earlier than was anticipated.

#### YUKON.

An order-in-council has been passed applying the regulation governing placer mining in the Yukon Territory to the district of Mackenzie.

Last month the construction of the Bonanza Basin Gold Co.'s dredge was completed, and operations commenced on the Klondike. Some of the plants are meanwhile being equipped with special appliances for thawing the gravel during the winter season, in order that operations may be continued during cold weather.

Preparations are being made to commence development operations on the Silver King property in the new Windy Arm district, while it is reported that the Dale properties have been bonded for the sum of \$100,000.00. The recent heavy rains in the Yukon during September will, it is said, result in an increase of output of nearly a million dollars over what was expected, though the production of the Territory will, nevertheless, be not very much more than two-thirds that of last year, owing to the exceptionally dry weather during July, and in addition to this a number of changes have recently been made.

Dredging operations were commenced on the 8th of October at the Bonanza Basin Gold Dredging Company's property, at the mouth of the Klondike River. The Yukon World states that the new dredge is dissimilar in many respects from those now working in the Yukon, the difference being that the buckets dump the debris in a bin, from which it is washed into a grizzly, and is perforated with holes four inches in diameter. The gravel then drops into a basin from which it is washed into a sluice box leading into a well, whence the finer gravel is



picked up by a 12 inch centrifugal pump, and finally carried over Hungarian riffles.

The output of gold in the Yukon was this year smaller than that of last year, the falling off being due to a lack of water. But it is also worthy of notice that the best grounds on the available creeks are getting worked out. In a recent interview in Winnipeg, Mr. E. C. Senkler, gold commissioner for the Yukon, expressed the opinion that as time goes on the miners will have to resort to large methods of working low-pay gravel. New methods have already been used with some success. This summer a company brought in one of the largest dredges ever used in mining, and in the seven weeks before the close of the season took from the ground about \$100,000. This success will have the effect of making modern machinery more common in the Klondike. The great need of the country is for the Government to bring in, by means of ditches and flumes, a large supply of water for mining purposes. Although the expense of this would be enormous, it is thought to be justified by the promise of great results. The future of the Klondike lies in its vast expanses of low pay gravel. It may be safely predicted that there will be remunerative placer mining in the country for very many years to come.

### THE ZINC COMMISSION.

At a public meeting of mine owners and others, held at New Denver on October 11th, at which were present representatives of the Comstock, Bosun, Hartney group, the Standard, Red Fox, Monitor, Wakefield, and Mercury mines, the following resolutions were passed:—

1. Whereas, articles have appeared in local newspapers purporting that general dissatisfaction exists with the operation of the zinc commission, and

Whereas, it is believed that such feeling is not prevalent and that opposition, confined to a few, is largely actuated by personal or selfish motives, and

Whereas, the zinc commission is investigating Slocan Lake district,

Therefore, be it resolved, that no dissatisfaction exists with such investigation as conducted in Slocan Lake district and that condemnation or criticism before publication of the report is ridiculous and unwarranted.

2. That the results to be obtained by establishing a free assay office would not further the object of the commission and would result in waste of public money.

### NOVA SCOTIA COAL AND THE ONTARIO MARKET.

A correspondent writes to the Montreal Daily Gazette as follows:—"The Dominion Coal Company is recognized as one of the largest as well as most progressive coal companies in America. Under the management of James Ross it has gained greatly in public confidence. Recognizing the necessity of a large market, Mr. Ross has boldly invaded Ontario, hitherto held exclusively by American mines, and filled a large contract as far west as Deseronto. In accomplishing that feat on a commercial basis, Mr. Ross has conferred a great benefit to the trade. To Deseronto, the American freight rate is probably seventy-five cents less per ton than to Montreal, the Sydney freight rate is probably seventy-five cents more than to Montreal, total, \$1.50, or, to be within the mark, say, one dollar discrimination against Dominion coal in Deseronto, in comparison with it in Montreal in competition with American coal. It has now become manifest that if Sydney coal can compete (as Mr. Ross has demonstrated), with American coal in Deseronto with the duty on, it can compete with it in Montreal with the duty off, and have fifty cents or more to spare. An ounce of practice is worth a pound of theory, and with Mr. Ross's practical demonstration in view, it cannot now be alleged that American coal can compete with the Nova Scotia article in the Montreal market, duty or no duty.

Mr. Ross has proved that the duty has no protective value in Montreal. The increasing population in the mining districts in Nova Scotia, as well as the continuous development of that province, demand imperatively an enlarged market to prevent a certain glut in coal production, and a shrinkage in employment and wages. Mr. Ross is far-sighted enough to know this, and to be reaching out for new markets."

### COMPANY NOTES.

**The Durham Natural Gas and Oil Company, Ltd.,** of Durham, Ontario, has assigned to T. A. Harris.

**St. Eugene, (B.C.)**—The secretary of this company issued last month a circular to shareholders announcing the payment of a dividend at the rate of 2 per cent. for the quarter ended June 30th, 1905, this being the sixth dividend paid by the Company.

**The Ymir.**—The following cablegram has been received from the mine manager at the London office of the Ymir Gold Mines, Ltd.:

"Crosscut to the hanging wall level No. 7, fine body of ore; the average width is ten feet; average assay of ore is \$9." (Office note—This important ore body has been struck 230 feet east from the shaft, 200 feet below the discovery (5 feet wide, \$20), in level No. 5, which is 240 feet west from the shaft. Operating costs amount to about \$5 per ton on the present output, exclusive of development but this figure can be appreciably reduced on a larger output.)

**Le Roi No. 2.**—The mine manager cables for September: "Shipped 1,087 tons. The net receipts are \$19,412, being payment for 1,026 tons shipped and \$1,963 being payment for 68 tons of concentrates shipped; in all \$21,375, inclusive of \$2,818 for 250 tons from the dump."—August receipts, \$8,787.—

**Tyee Copper (B.C.)**—During September the smelter ran 11 days and treated 1,019 tons of Tyee ore, giving a return, after deduction of freight and refining charges of \$35,019.24.

**Le Roi.**—The September returns from this mine are as follows: 8,150 tons to the Northport smelter; 6,965 tons to Trail Smelting works; 1,185 tons, containing 3,079 ounces of gold, 3,050 ounces of silver and 172,850 pounds of copper; estimated profit on this ore after deducting cost of mining, smelting, realization and depreciation, \$17,000; expenditure on development during the month, \$10,000.

**The Payne Company (B.C.)**—A special meeting of the directors of the Payne Company was held in Montreal towards the end of October, when a decision was reached to lease the workings to Mr. Walker Smith for a term of three years. A report, giving the position of affairs, will shortly be sent to the shareholders.

**New Fairview Corporation, Limited.**—The secretary has issued a circular showing that the company's liabilities have again been reduced during the past year by the substantial sum of \$23,928.17.

The appearance of the ore-body under the fault, previously reported, was most promising when work was discontinued; and, if adequate funds to properly open this up in depth (which is an absolute necessity for future success) are forthcoming, the outlook is distinctly favorable.

The company's buildings, machinery, plant, and stores are all in good condition, and ready for the active resumption of operations at any time.

### MINING INCORPORATIONS.

#### ONTARIO.

**The Canadian Hart Corundum Wheel Co., Ltd.** Capital, \$75,000, in shares of \$100 each. Head office, Hamilton. Provisional directors: Geo. Frederick Webb, Seward Wilcox, Harley Ethelbert Sherck and Chas. Douglas Warren.



The Canadian Oil Refining Company, Ltd. Capital, \$100,000, in shares of \$100 each. Head office, Toronto. Provisional directors: John Frederick Hollis, Thos. Herbert Wilson, Thos. Henry Hamilton, William Perkins Bull and Annie Marie O'Brien.

The Standard Silver & Cobalt Mining Co., Ltd. Capital, \$40,000, in shares of \$1.00 each. Head office, New Liskeard. Provisional directors: Jno. Armstrong, Geo. Warrell, Jno. Sharpe, Elijah Field Stephenson and Wm. McNab Cameron.

The Brakehurst Oil Co., Ltd. Capital, \$100,000, in shares of \$50 each. Head office, Sarnia. Provisional directors: Geo. Montgomery Trefts, Josephine Winfield Brake and John Hingston Cooper.

The Rothschild Cobalt Co., Ltd. Capital, \$500,000, in shares of \$1.00 each. Head office, Haileybury. Provisional directors: Maniel Rothschild, Herman Joseph, Max Rothschild and John McKay.

The Northern Exploration Company, Ltd. Capital, \$100,000. Head office, Haileybury. Provisional directors: Frank Mortimer Perry, Stair Dick Lauder and Arthur Cyril Boyce.

Coleman Cobalt Mining Co., Ltd. Capital \$250,000, in shares of \$1.00 each. Head office, Toronto. Provisional directors: Albert Robert Moore, Hamilton Bender Wills and John Jennings.

#### BRITISH COLUMBIA.

The Northern & B. C. Sampling and Milling Co., Ltd. Capital, \$20,000, in shares of \$1.00 each.

The San Juan Mining & Mfg. Co., Ltd. Capital, \$1,000,000, in shares of \$1.00 each.

Green City Gold Mining, Smelting & Development Co., Ltd. Capital, \$1,500,000, in shares of \$1.00 each.

Spitzee Mining Co., Ltd. Capital \$350,000, in shares of \$5.00 each.

Alaska Pumice Stone, Hydraulic, Cement & Trading Co., Ltd. Capital, \$50,000, in shares of \$1.00 each.

#### INDUSTRIAL AND MACHINERY NOTES.

The Canadian Northern Coal & Ore Dock Company, Port Arthur, Ont., recently purchased from Robb Engineering Co., Ltd., Amherst, N.S., one 300 h.p. Robb-Armstrong tandem engine.

The Montreal Copper Co. recently made a shipment of 100,000 pounds of refined ingot copper to China to be used by the Government of that country for coinage purposes. The company was founded a little over a year ago. It is now proposed to install a larger plant for the refining of copper at these works.

The Canadian factory at Montreal of the Syracuse Smelting Works have recently made some large shipments of their products to Europe, and also to China and Japan. They inform us that their babbitt metal business is expanding wonderfully. Messrs. L. and H. Sapery, the proprietors, are Canadians, and deserve much credit in establishing branch works in New York from which to supply their American trade.

An increasing demand for the gas engine is noticeable, due no doubt to greater appreciation of the excellent operating economy of this class of prime mover. The Westinghouse Machine Company, of East Pittsburg, Pa., the first manufacturers of large gas engines in America, have received within the last few weeks many orders for gas engines, ranging from 10 B.H.P. to 1,000 B.H.P. No less than thirty-six gas engines are covered by these orders, aggregating 6,647 B.H.P.

The Pennsylvania Railroad Company has very recently placed an order with The Westinghouse Machine Company for six 132 in. x 26 grate and four 100 in. x 20 grate Roney mechanical stokers to extend their already large

equipment at Altoona. Two new boiler plants were erected at Altoona only a few years ago, for supplying steam power at the Altoona shops. These plants were both equipped throughout with Roney mechanical stokers, and are thoroughly representative of the highest development of modern boiler plant construction.

The confidence of Cobalt miners in the future of that district is shown by the scale on which they are investing in mining machinery. M. J. O'Brien & Co., whose mine is on the edge of Cobalt Lake, recently bought from Allis-Chalmers-Bullock, Limited, a complete power house equipment, including boilers, hoisting engines, 7-drill compressor plant, boiler feed pump, large general supply pump, high speed engine and generator for electric lighting. The compressor is of the Ingersoll-Sergeant self-contained type and the whole machine is mounted on a continuous box girder frame, specially designed for heavy mining work.

Three orders of large size have recently been received by the Westinghouse Machine Company of East Pittsburg, Pa., for their Ronay mechanical stoker. One order from the Jones & Laughlin Steel Company of Pittsburg, Pa., calls for sixteen 114 in. x 24 grate stokers, one from the Lehigh Valley Traction Company of Philadelphia, Pa., calls for eight 130 in. x 20 grate stokers, and another from the Pressed Steel Car Company of Pittsburg, Pa., covers six 100 in. x 20 grate mechanical stokers. These stokers are of the inclined rocking grate type with removable fuel plates, and are provided with the necessary actuating mechanism for automatically controlling the motion of the grate-bars and the supply of fuel. They will be capable of burning low grade bituminous coal efficiently and without smoke.

Steam shovels are the latest addition to the already numerous products of the Allis-Chalmers Co., Milwaukee, represented in Canada by Allis-Chalmers-Bullock, Limited, Montreal. They are especially designed to meet all requirements of up-to-date contractors. One of the many good features claimed for the Allis-Chalmers steam shovel, is the method of operating dipper with drum of different diameters on the boom. The rope from hoisting engine drum passes around the large diameter of the boom-drum and is permanently fastened to it. Two ropes lead to the dipper from smaller diameters of the boom-drum, one on each side of the large diameter, which increases the pull on the hoisting rope without multiplying gears, and materially quickens the operation of shovel without carrying an immense weight on the boom. These and other features are admirably illustrated in Bulletin No. 1402.

Messrs. the John McDougall Caledonian Iron Works Co., Ltd., have been appointed sole manufacturers in Canada of the Blaisdell Cyanide Excavating Machinery, under the various patents owned and controlled by the Blaisdell Co., of Los Angeles, Cal. This machinery was invented by Mr. H. W. Blaisdell, who has had an active experience in mining and milling gold ores extending over twenty-five years. After a series of experiments, this machinery, consisting of excavators, distributors, tailings stackers, aerators and mixers, was produced, and thus abolishing unskilled labor from cyanide plants and providing the final link for a complete mechanical method of handling ore between the mine and the dump was successful. These plants have already been installed in various parts of the United States and have met with great success during the last few years.

#### MAJOR DAVID BEAMES,

Late I.S.C., and of Berkhamstead, England.

If the above will communicate with C. J. Walker's Advertising Agency, 24 Coleman Street, London, England, he may hear of something to his advantage.



# PROVINCE OF QUEBEC

The attention of Miners and Capitalists in the United States  
and in Europe is invited to the

## GREAT MINERAL TERRITORY

Open for investment in the Province of Quebec.

**Gold, Silver, Copper, Iron, Asbestos, Mica, Plumbago, Phosphate,  
Chromic Iron, Galena, Etc.**

**ORNAMENTAL AND STRUCTURAL MATERIALS IN ABUNDANT VARIETY,**

**The Mining Law gives absolute security to Title, and has been  
specially framed for the encouragement of Mining.**

Mining concessions are divided into three classes:—

1. In unsurveyed territory (a) the first class contains 400 acres, (b) the second, 200 acres, and (c) the third, 100 acres.

2. In surveyed townships the three classes respectively comprise one, two and four lots.

All lands supposed to contain mines or ores belonging to the Crown may be acquired from the Commissioner of Colonization and Mines (a) as a mining concession by purchase, or (b) be occupied and worked under a mining license.

No sale of mining concessions containing more than 400 acres in superficies can be made by the Commissioner to the same person. The Governor-in-Council may, however, grant a larger extent of territory up to 1,000 acres under special circumstances.

The rates charged and to be paid in full at the time of the purchase are \$5 and \$10 per acre for mining lands containing the superior metals\*; the first named price being for lands situated more than 12 miles and the last named for lands situated less than 12 miles from the railway.

If containing the inferior metal, \$2 and \$4 according to distance from railway.

Unless stipulated to the contrary in the letters patent in concessions for the mining of superior metals, the purchaser has the right to mine for all metals found therein; in concessions for the mining of the inferior metals, those only may be mined for.

\*The superior metals include the ores of gold, silver, lead, nickel, graphite, asbestos, mica, and phosphate of lime. The word metals include all other minerals, and ores.

Mining lands are sold on the express condition that the purchaser shall commence bona fide to mine within two years from the date of purchase, and shall not spend less than \$500 if mining for the superior metals; and not less than \$200 if for inferior metals. In default, cancellation of sale of mining lands.

(b) Licenses may be obtained on the following terms:—A prospecting license, if the every 100 acres or fraction of lands (1) in surveyed (2) in unsurveyed license to be valid holder of such license paying the price

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The fullest information will be cheerfully

THE MINING

# Ontario's

## Mining

### Lands..

**T**HE Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals and extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and sulphides; zincblende, galena, pyrites, mica, graphite, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places, and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the sources of the world's supply of nickel, and the known stocks of this metal are very large. Recent discoveries of nickel in Eastern Ontario are believed to be the most extensive.

Output of iron, copper and nickel in 1903 was much greater than in any previous year, and large developments in these industries are now going on.

In various parts of the Province salt, petroleum and other important products.

The laws of Ontario are liberal, and the prices of land obtained by freehold or lease, on working conditions, are no royalties.

Timber, coal, wood and water are plentiful, and a prospector can go almost anywhere.

A railway runs through the entire Province.

For details, see maps, mining laws, etc.,

**JOCHANE,**

Miner of Lands and Mines.





## PROVINCE OF NOVA SCOTIA.

Leases for Mines of Gold, Silver, Coal, Iron, Copper, Lead, Tin

— AND —

## PRECIOUS STONES.

TITLES GIVEN DIRECT FROM THE CROWN, ROYALTIES AND RENTALS MODERATE.

### GOLD AND SILVER.

Under the provisions of Chap. 1, Acts of 1892, of Mines and Minerals, Licenses are issued for prospecting Gold and Silver for a term of twelve months. Mines of Gold and Silver are laid off in areas of 150 by 250 feet, any number of which up to one hundred can be included in one License, provided that the length of the block does not exceed twice its width. The cost is 50 cents per area. Leases of any number of areas are granted for a term of 40 years at \$2.00 per area. These leases are forfeitable if not worked, but advantage can be taken of a recent Act by which on payment of 50 cents annually for each area contained in the lease it becomes non-forfeitable if the labor be not performed.

Licenses are issued to owners of quartz crushing mills,

who are required to pay Royalty on all the Gold they extract at the rate of two per cent. on smelted Gold valued at \$19 an ounce, and on smelted Gold valued at \$18 an ounce.

Applications for Licenses or Leases are receivable at the office of the Commissioner of Public Works and Mines each week day from 10 a.m. to 4 p.m., except Saturday, when the hours are from 10 to 1. Licenses are issued in the order of application according to priority. If a person discovers Gold in any part of the Province, he may stake out the boundaries of the areas he desires to obtain, and this gives him one week and twenty-four hours for every 15 miles from Halifax in which to make application at the Department for his ground.

### MINES OTHER THAN GOLD AND SILVER.

Licenses to search for eighteen months are issued, at a cost of thirty dollars, for minerals other than Gold and Silver, out of which areas can be selected for mining under lease. These leases are for four renewable terms of twenty years each. The cost for the first year is fifty dollars, and an annual rental of thirty dollars secures each lease from liability to forfeiture for non-working.

All rentals are refunded if afterwards the areas are worked and pay royalties. All titles, transfers, etc., of minerals are registered by the Mines Department for a nominal fee, and provision is made for lessees and licensees whereby they can acquire promptly, either by arrangement with the owner or by arbitration, all land required for their mining works.

The Government as a security for the payment of royalties, makes the royalties first lien on the plant and fixtures of the mine.

The unusually generous conditions under which the Government of Nova Scotia grants its minerals have introduced many outside capitalists, who have always stated that the Mining laws of the Province were the best they had had experience of.

The royalties on the remaining minerals are: Copper, four cents on every unit; Lead, two cents upon every unit; Iron, five cents on every ton; Tin and Precious Stones, five per cent.; coal, 10 cents on every ton sold.

The Gold district of the Province extends along its entire Atlantic coast, and varies in width from 10 to 40 miles, and embraces an area of over three thousand miles, and is traversed by good roads and accessible at all points by water. Coal is known in the Counties of Cumberland, Colchester, Pictou and Antigonish, and at numerous points in the Island of Cape Breton. The ores of Iron, Copper, etc., are met at numerous points, and are being rapidly secured by miners and investors.

Copies of the Mining Law and any information can be had on application to

THE HON. W. T. PIPES,

Commissioner Public Works and Mines,

HALIFAX, NOVA SCOTIA.



# DOMINION OF CANADA

## SYNOPSIS OF REGULATIONS

### For disposal of Minerals on Dominion Lands in Manitoba, the North-West Territories and the Yukon Territory.

#### COAL.

Coal lands may be purchased at \$10 per acre for soft coal and \$20 for anthracite. Not more than 320 acres can be acquired by one individual or company. Royalty at the rate of ten cents per ton of 2,000 pounds shall be collected on the gross output.

#### QUARTZ.

Persons of eighteen years and over and joint stock companies holding free miner's certificates may obtain entry for a mining location.

A free miner's certificate is granted for one or more years, not exceeding five, upon payment in advance of \$7.50 per annum for an individual, and from \$50 to \$100 per annum for a company, according to capital.

A free miner, having discovered mineral in place, may locate a claim 1,500 x 1,500 feet by marking out the same with two legal posts, bearing location notices, one at each end on the line of the lode or vein.

The claim shall be recorded within 15 days if located within ten miles of a mining recorder's office, one additional day allowed for every additional ten miles or fraction. The fee for recording a claim is \$5.

At least \$100 must be expended on the claim each year or paid to the mining recorder in lieu thereof. When \$500 has been expended or paid, the locator may, upon having a survey made, and upon complying with other requirements, purchase the land at \$1.00 an acre.

Permission may be granted by the Minister of the Interior to locate claims containing iron and mica, also copper, in the Yukon Territory of an area not extending 160 acres.

The patent for a mining location shall provide for the payment of a Royalty of  $2\frac{1}{2}$  per cent. of the sales of the products of the location.

#### PLACER MINING.

Manitoba and the N. W. T., excepting the Yukon Territory.—Placer mining claims generally are 100 feet square; entry fee \$5, renewable yearly. On the North Saskatchewan River claims are either bar or bench, the former being 100 feet long and extending between high and low water mark. The latter includes bar diggings, but extends back to the base of the hill or bank, but not exceeding 1,000 feet. Where steam power is used, claims 200 feet wide may be obtained.

Dredging in the rivers of Manitoba and the N. W. T., excepting the Yukon Territory.—A free miner may obtain only two leases of five miles each for a term of twenty years, renewable in the discretion of the Minister of the Interior.

The lessee's right is confined to the submerged bed or bars of the river below low water mark, and subject to the rights of all persons who have, or who may receive entries for bar diggings or bench claims, except on the Saskatchewan River, where the lessee may dredge to high water mark on each alternate leasehold.

The lessee shall have a dredge in operation within one season from the date of the lease for each five miles, but where a person or company has obtained more than one lease one dredge for each fifteen miles or fraction is sufficient. Rental, \$10 per annum for each mile of river leased. Royalty at the rate of two and a half per cent. collected on the output after it exceeds \$10,000.

#### DREDGING IN THE YUKON TERRITORY.

Six leases of five miles each may be granted to a free miner for a term of twenty years, also renewable.

The lessee's right is confined to the submerged bed or bars in the river below low water mark, that boundary to be fixed by its position on the 1st day of August in the year of the date of the lease.

The lessee shall have one dredge in operation within two years from the date of the lease, and one dredge for each five miles within six years from such date. Rental, \$100 per mile for first year and \$10 per mile for each subsequent year. Royalty, same as placer mining.

#### PLACER MINING IN THE YUKON TERRITORY.

Creek, gulch, river and hill claims shall not exceed 250 feet in length, measured on the base line or general direction of the creek or gulch, the width being from 1,000 to 2,000 feet. All other placer claims shall be 250 feet square.

Claims are marked by two legal posts, one at each end, bearing notices. Entry must be made within ten days, if the claim is within ten miles of mining recorder's office. One extra day allowed for each additional ten miles or fraction.

The person or company staking a claim must hold a free miner's certificate.

The discoverer of a new mine is entitled to a claim of 1,000 feet in length, and if the party consists of two, 1,500 feet altogether, on the output of which no royalty shall be charged, the rest of the party ordinary claims only.

Entry fee, \$10. Royalty at the rate of two and one-half per cent. on the value of the gold shipped from the Yukon Territory to be paid to the Comptroller.

No free miner shall receive a grant of more than one mining claim on each separate river, creek or gulch, but the same miner may hold any number of claims by purchase, and free miners may work their claims in partnership by filing notice and paying fee of \$2. A claim may be abandoned, and another obtained on the same creek, gulch or river, by giving notice and paying a fee.

Work must be done on a claim each year to the value of at least \$200.

A certificate that work has been done must be obtained each year; if not, the claim shall be deemed to be abandoned, and open to occupation and entry by a free miner.

The boundaries of a claim may be defined absolutely by having a survey made and publishing notices in the Yukon Official Gazette.

#### PETROLEUM.

All unappropriated Dominion Lands in Manitoba, the North-West Territories and within the Yukon Territory are open to prospecting for petroleum, and the Minister may reserve for an individual or company having machinery on the land to be prospected, an area of 640 acres. Should the prospector discover oil in paying quantities, and satisfactorily establish such discovery, an area not exceeding 640 acres, including the oil well and such other land as may be determined, will be sold to the discoverer at the rate of \$1.00 an acre subject to royalty at such rate as may be specified by order-in-council.



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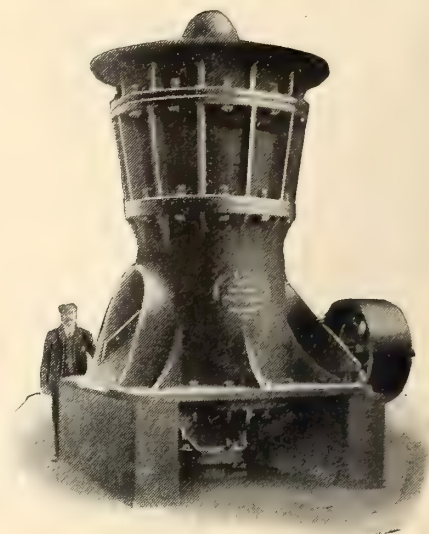
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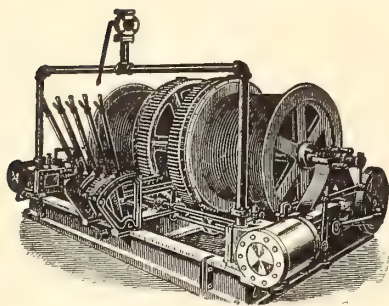


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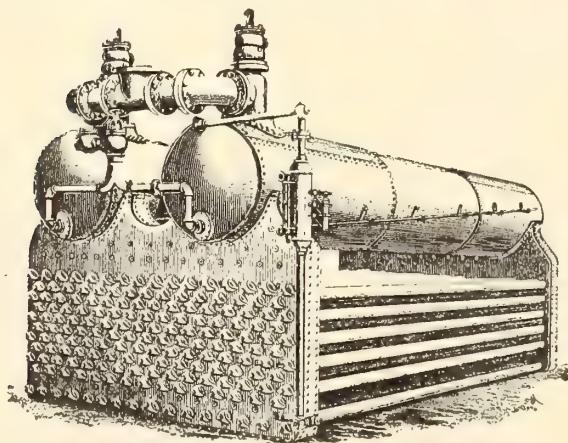
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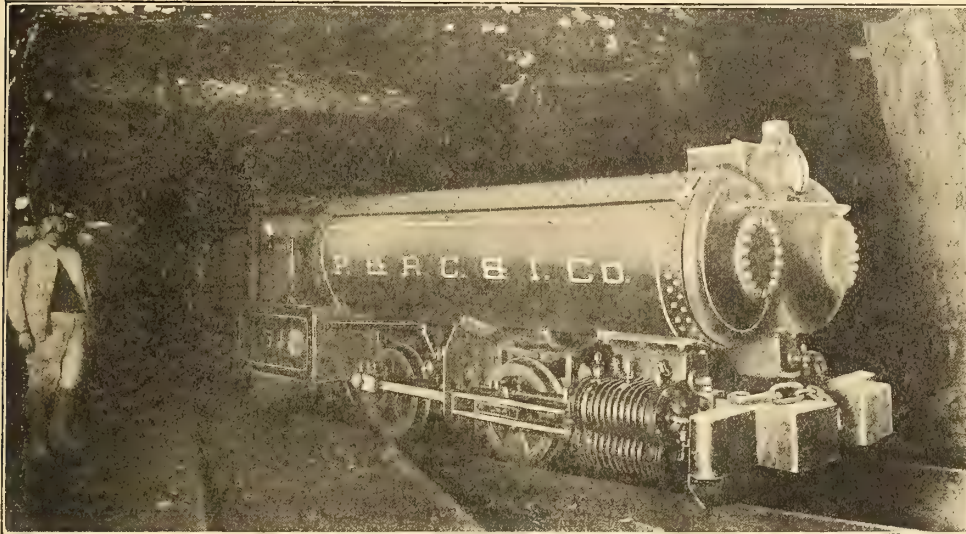


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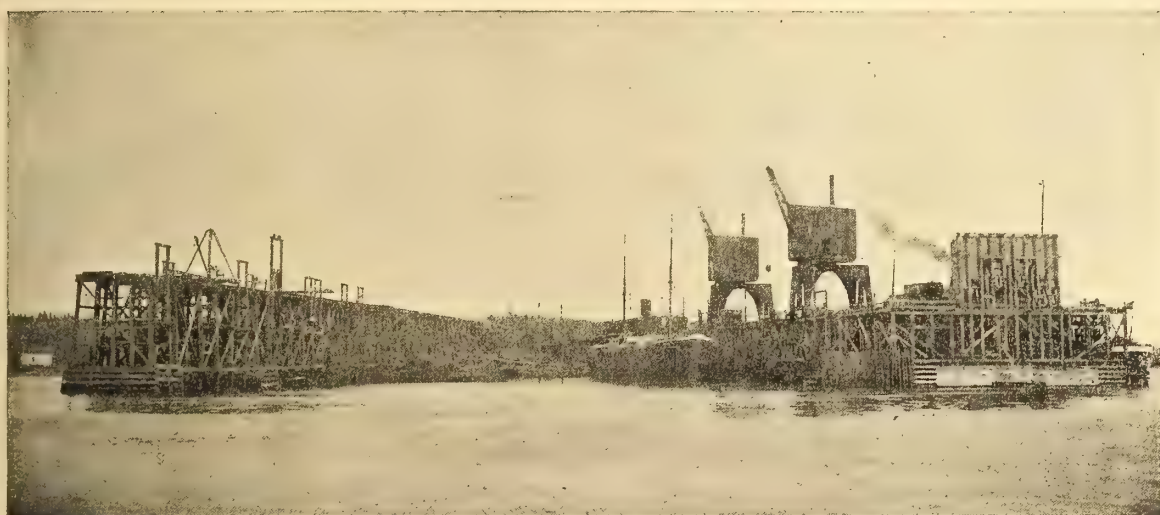
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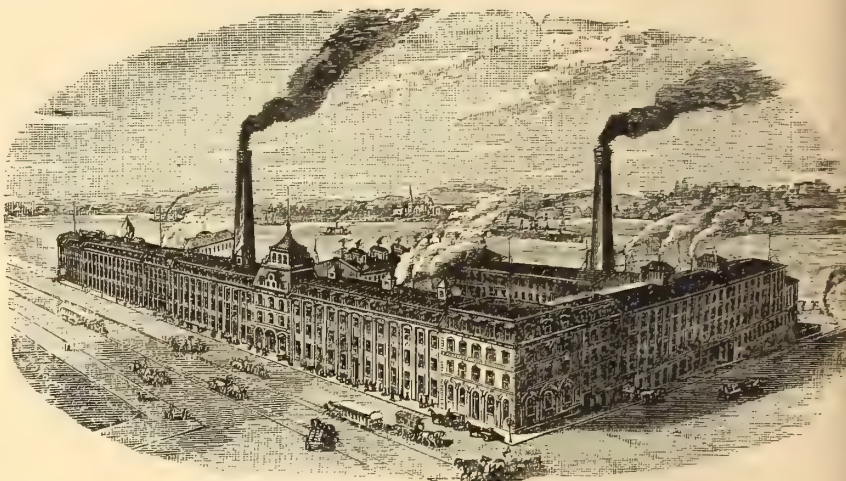
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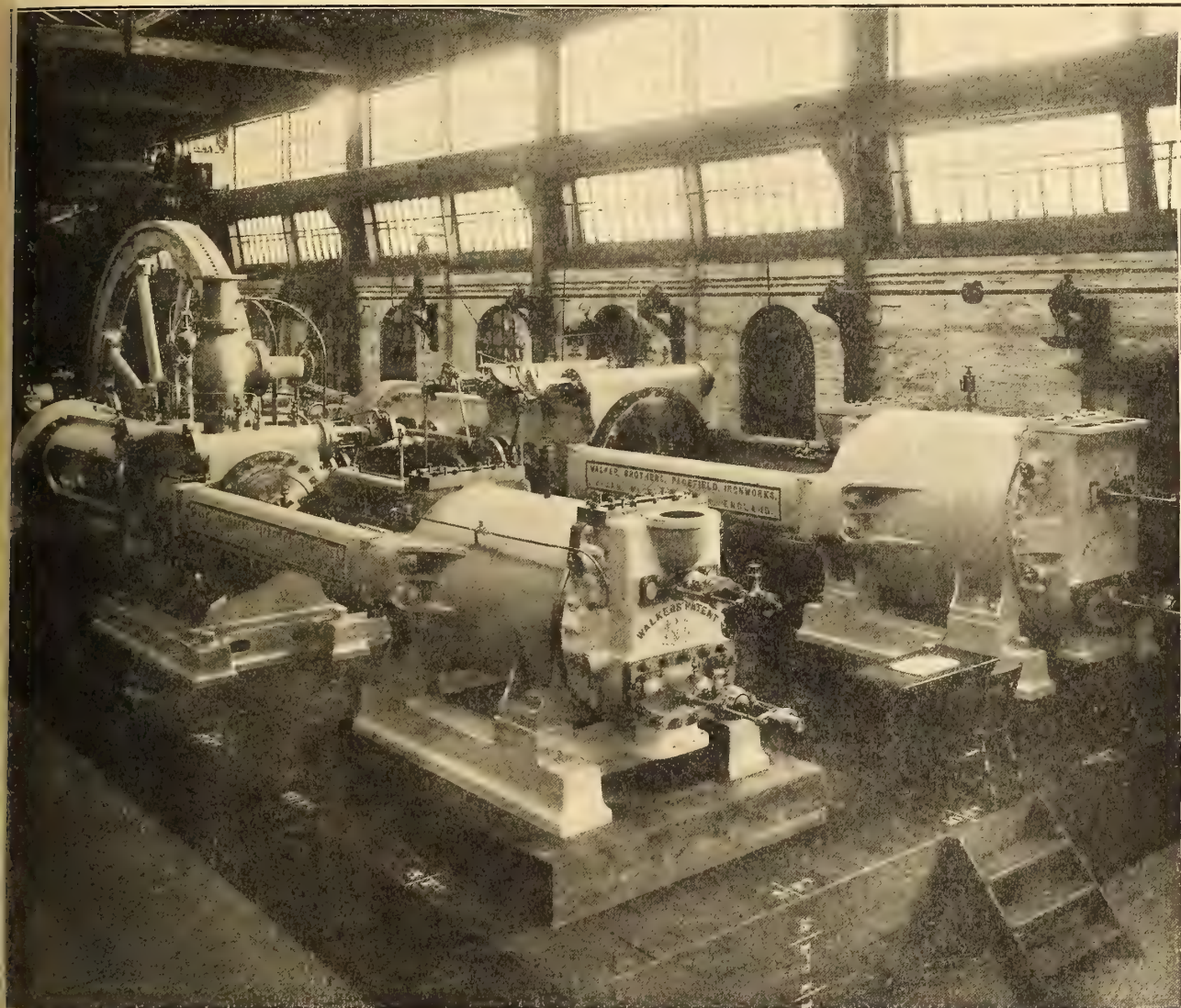
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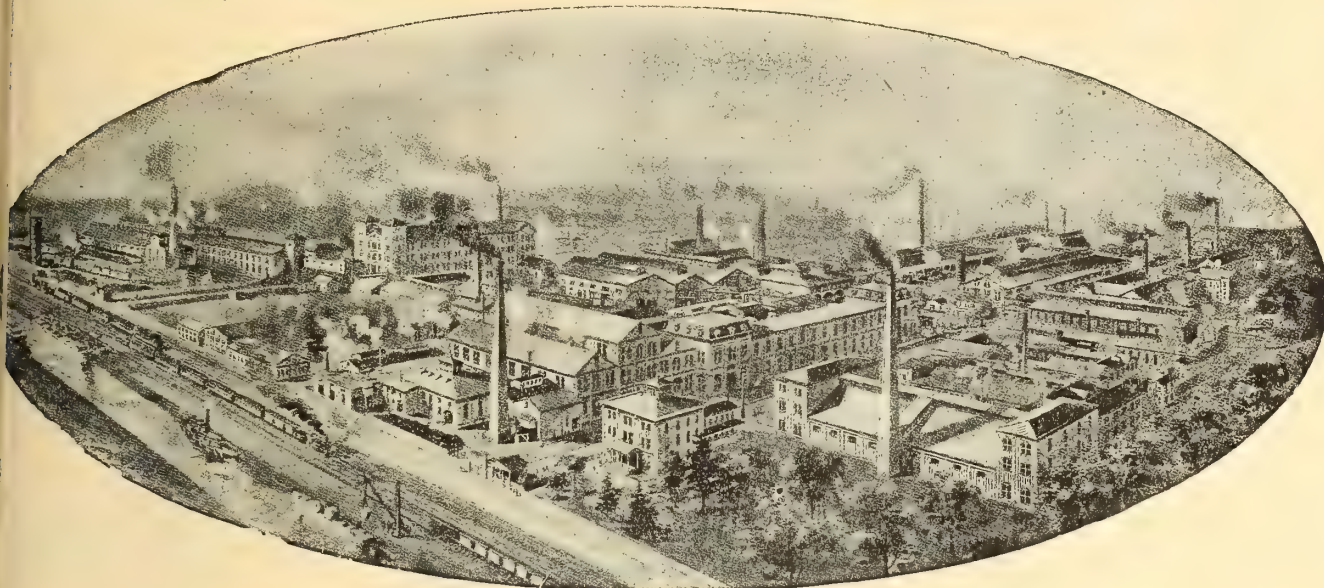
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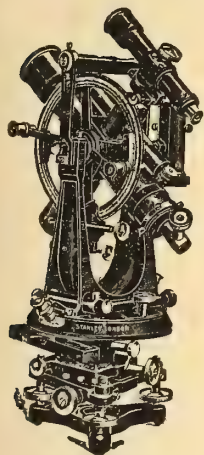
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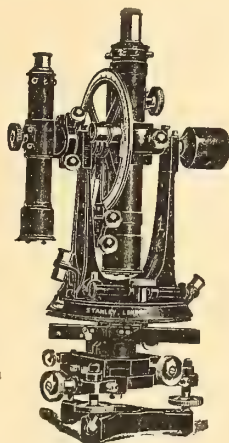
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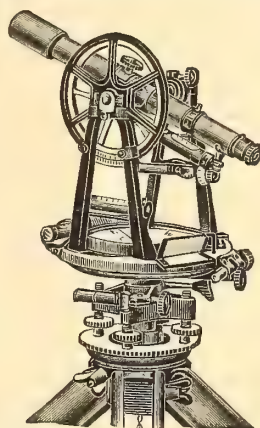
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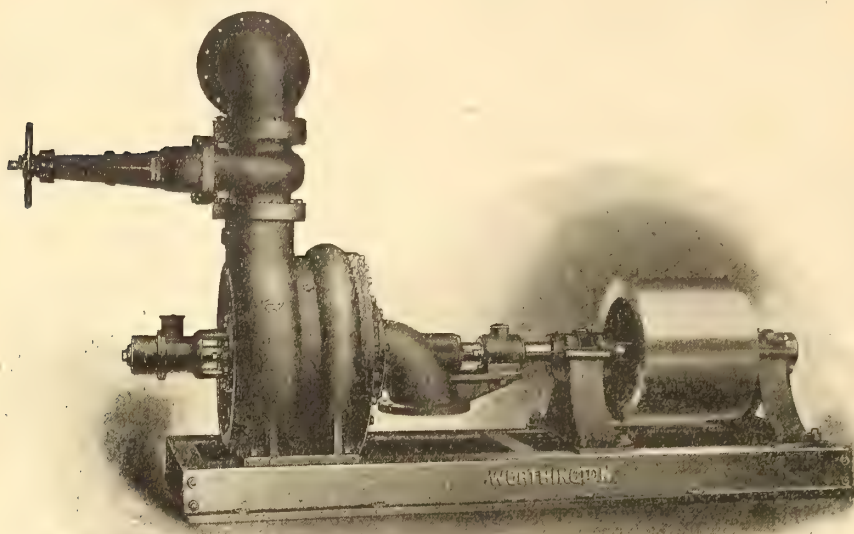
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| Vol. II, 1899, 285 pp., bound red cloth  | Vol. VI, 1903, 520 pp., bound.  |
| Vol. III, 1900, 270 pp., bound red cloth | Vol. VII, 1904, 530 pp., bound. |
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Membership in the Canadian Mining Institute is open to everyone interested in promoting the profession and industry of mining without qualification or restrictions.

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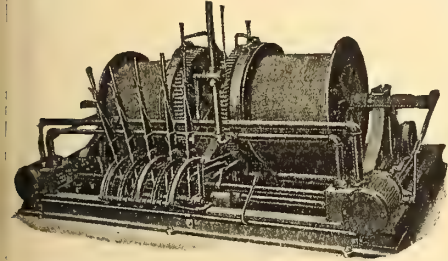


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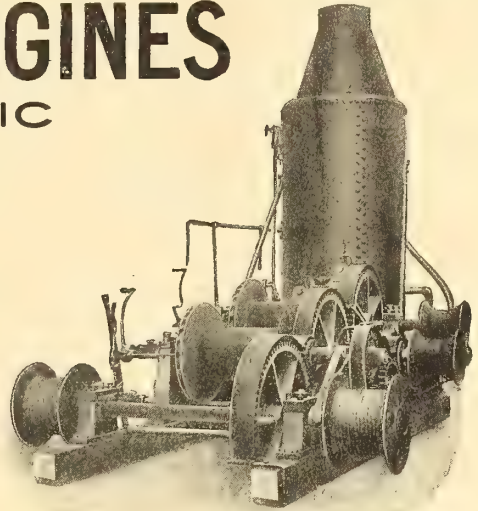
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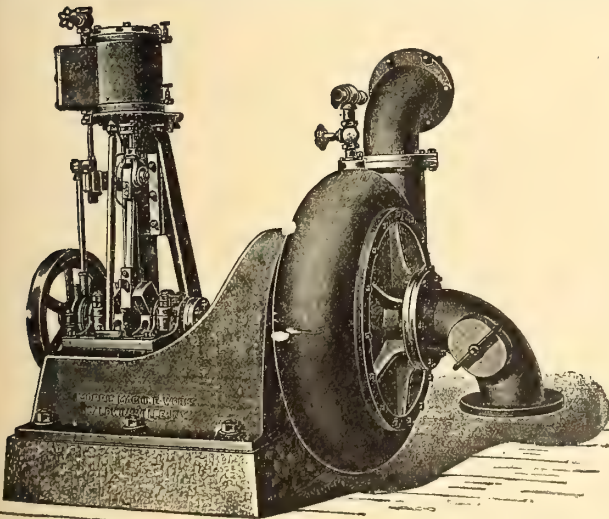
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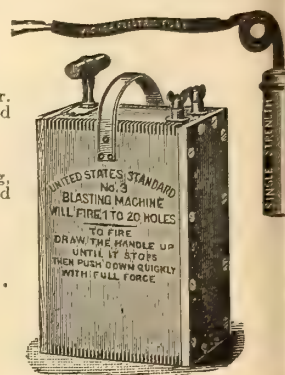
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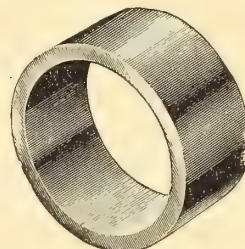
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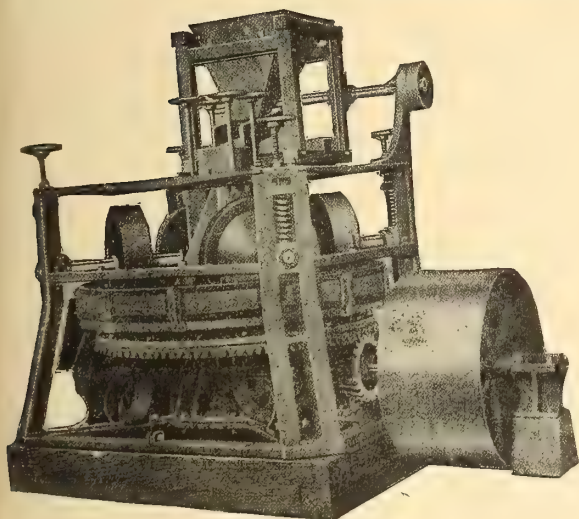
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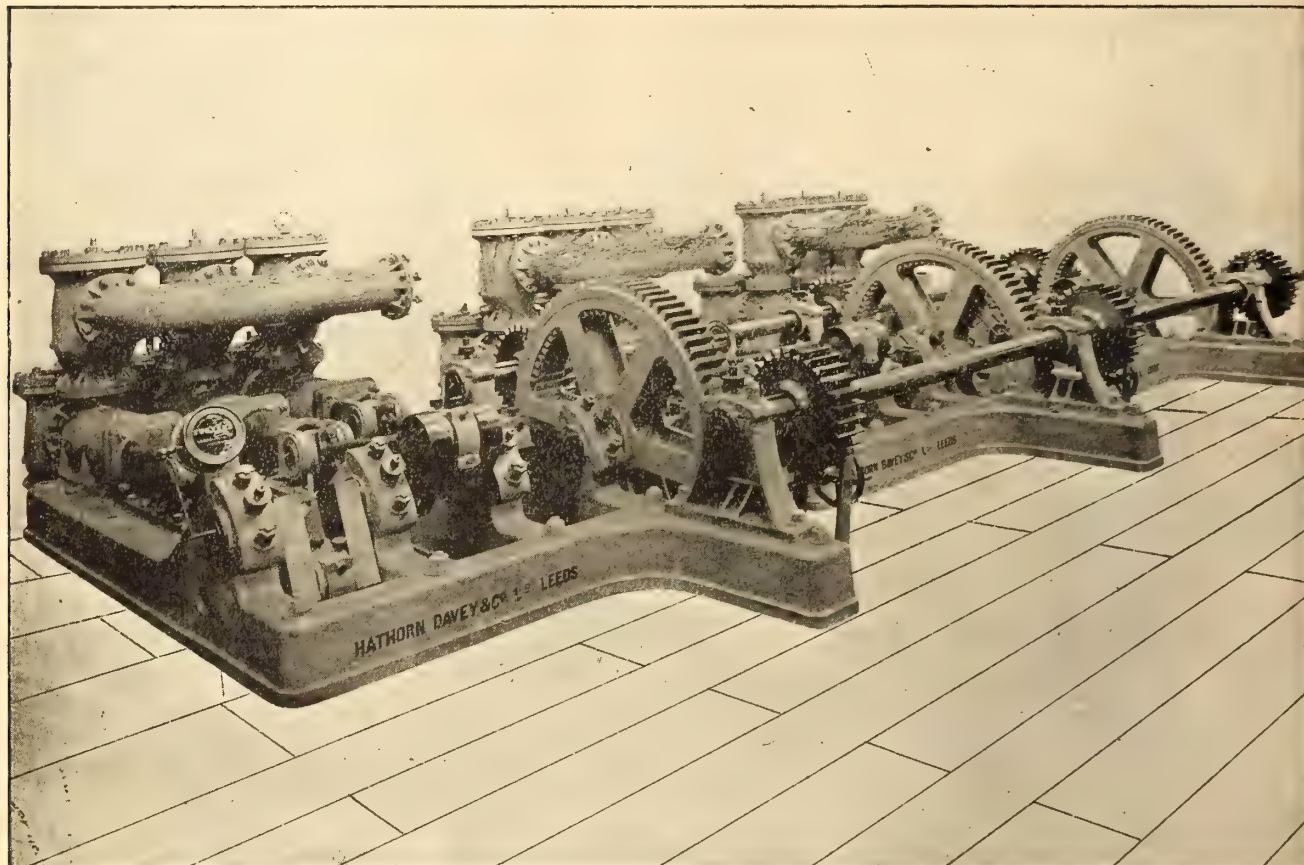
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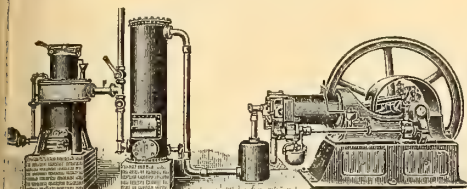
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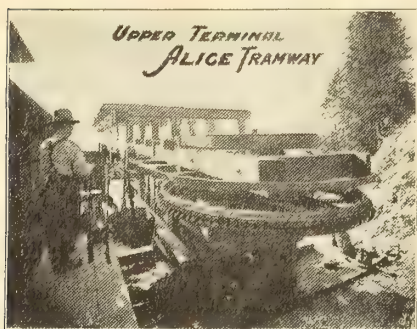
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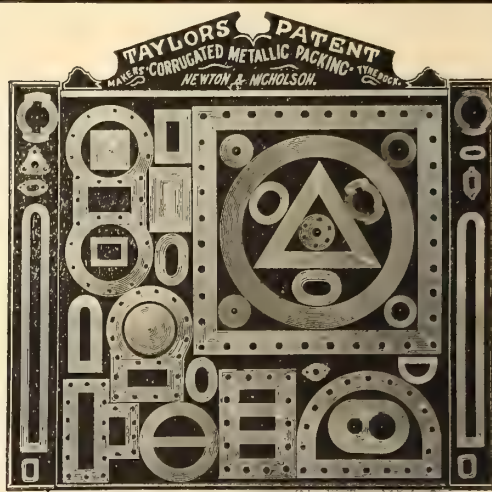
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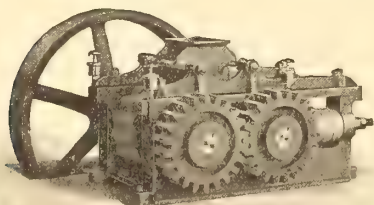
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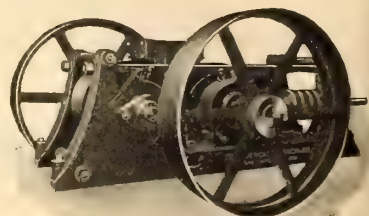
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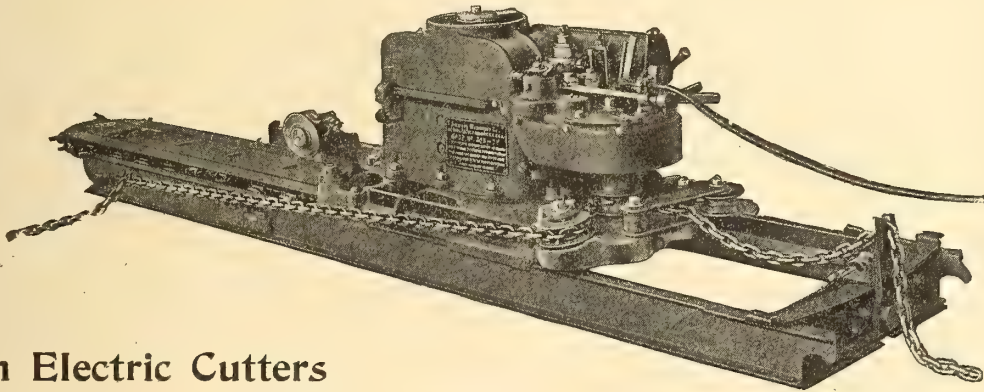
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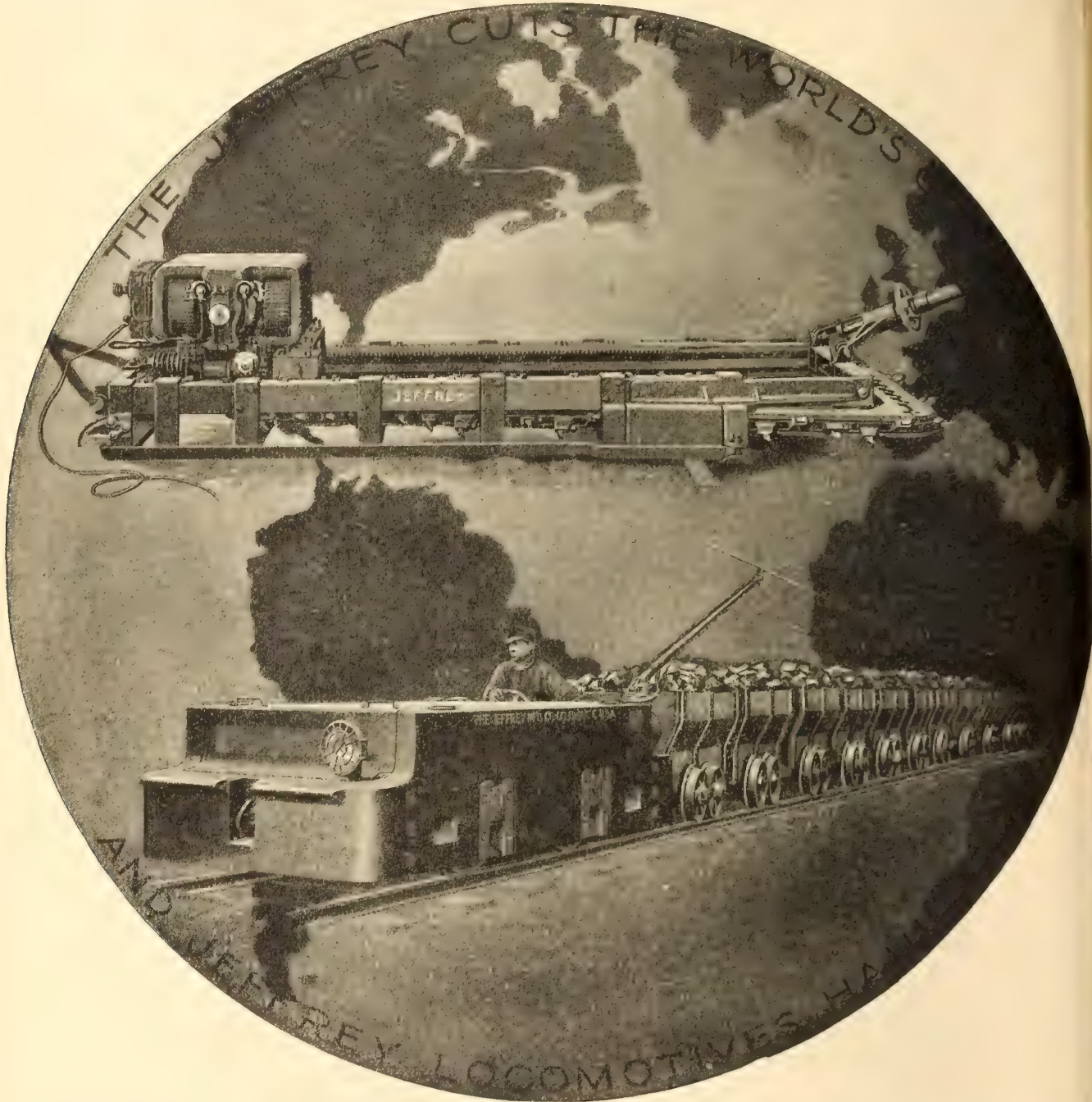
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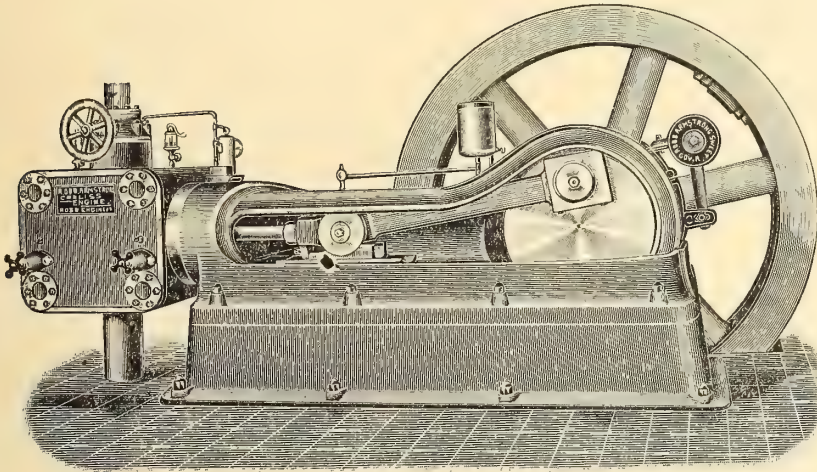
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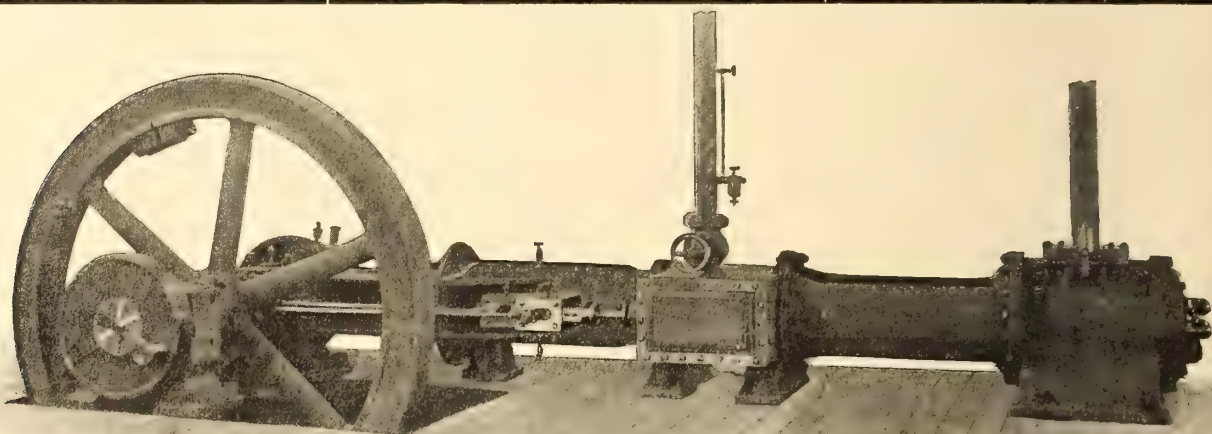
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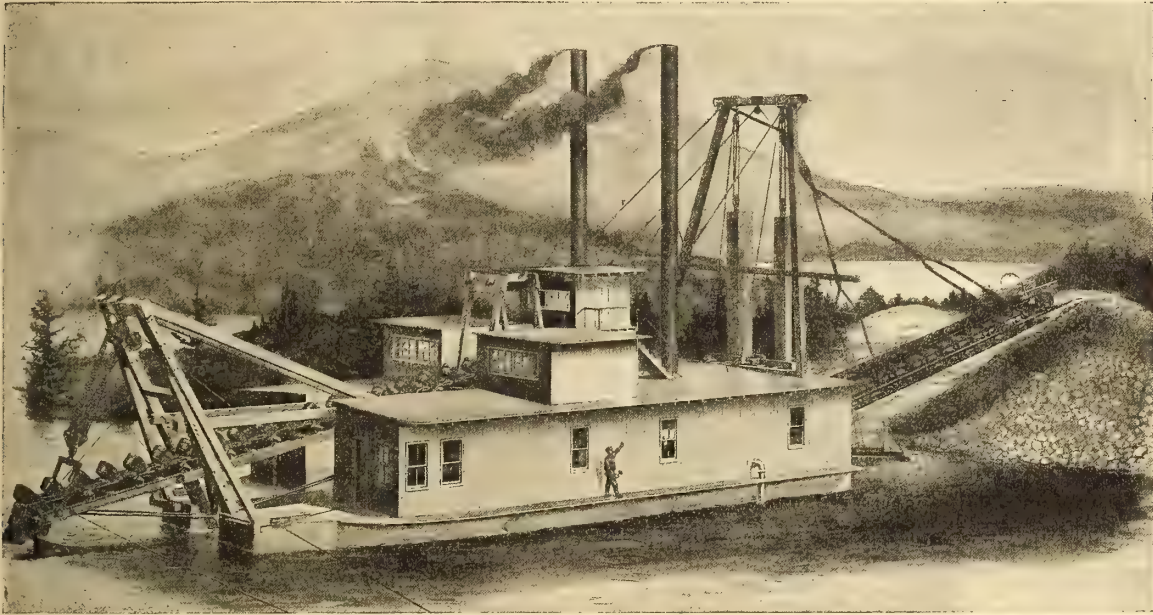
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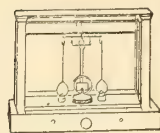
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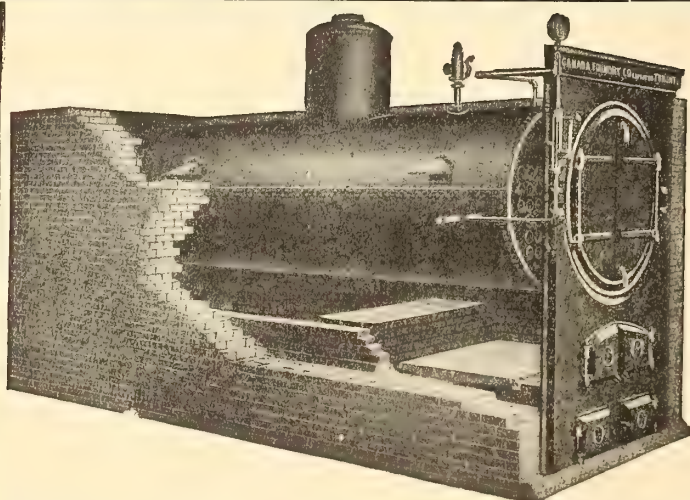
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# The CANADIAN MINING REVIEW

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It now turns out, according to a statement made in an interview with the Rossland *Miner* by Mr. F. C. Winkler, representing the Canadian Oil Company, in the Kootenays, that the much heralded striking of a "gusher" on the Rocky Mountain Development Company's property at Pincher Creek, was a fabrication, manufactured out of whole cloth, made and circulated solely for stock jobbing purposes. Whether Mr. Winkler's information is correct or not, the public should always remember, when asked to believe any statement in connection with oil discoveries, that while "natural gas" may in one sense, be a sufficient indication of the presence of oil, it isn't always in another.

We call attention to the interesting argument of Mr. J. M. Clark, K.C., of Toronto (in what is known as the Gates lease case) published in this issue. We are exceedingly pleased to learn that the Ontario Government have given effect to this argument and have dismissed the application for a fiat to attack this lease in the Courts. This decision, which is along the lines of policy advocated by the MINING REVIEW will commend itself to the mining community generally. Mr. Clark, the successful counsel in this case, is one of the authors of "The Law of Mines in Canada," a valuable work which should be specially studied by mining men at the present time in view of the proposed revision of the mining laws of Ontario.

We commend to the attention of our Ontario readers "J.B.'s" interesting letter published in another column on the subject of the proposed revision of the mining law in that Province. We do not endorse all the views of our correspondent, but the communication nevertheless contains numerous valuable suggestions, written by a man who has a large experience and knowledge of the subject anent which he writes. A special feature of this issue, also, is an article contributed by Dr. R. W. Raymond, the well-known specialist and authority on mining law, wherein "the requirements for a possessory mining title" is ably discussed. This article is published in the hope and belief that it will prove of use to the delegates attending the Toronto Convention to be held on Dec. 12th.

The market for the ores coming from the Cobalt district in New Ontario has been so uncertain and so small during the last six weeks as to have caused considerable anxiety to the owners of property in that

The report which originated in British Columbia, that a sale of the Consolidated Cariboo Hydraulic had been made to Messrs. Guggenheim, is altogether premature, although it is true, negotiations are now in progress. It is understood that should the transfer be completed, Mr. J. B. Hobson will continue to be retained as manager of the mine.



section. We understand that a general meeting of the owners of producing mines was held at Cobalt on the 16th of November, where the difficulties in the sale of ore were thoroughly ventilated and discussed, and the matter of future sales and of united action on the part of the producing mines, was intrusted to a committee, for full investigation and subsequent report. It is to be hoped that the question will be satisfactorily solved, and in a manner which will be beneficial to the mine owners, as it would not only be detrimental to Ontario, but to Canada as a whole, should there have to be any curtailment of production from this district by reason of diminished markets. Incidentally, we are informed that the whole difficulty arises from the complex metallurgical problem which is presented by the composition of these ores. Concerning the solution of this problem there are many proposals, but we have yet to learn of one that is accepted as a certain solution of the question.

Mining men generally throughout Ontario have availed themselves of the opportunity afforded by the meetings called by the Division Inspectors, to discuss the present mining laws and to suggest amendments thereto, and during the past few weeks interesting meetings have been held at Sault Ste. Marie, Sudbury, Cobalt and other mining centres for this purpose. Upon many questions at issue these meetings have not been in accord, nor could agreement have been expected in all details; but in the main there has been unanimity in the demand for a fixed statute which shall not be amenable to frequent and unnotified changes through the issuance of orders-in-council. In respect to the validity of locations there has also been a general declaration in favor of the view which the letter of the present Act demands, namely, the right of the locator to undisturbed possession for a certain period during which he must find mineral in place, failing which he must surrender the right to exclusive possession. Opinion, also, appears to be unanimous in that only work performed should be permitted to hold a mining claim, and that no money payment should be allowed to commute or replace the labor equivalent. In upholding this view the mining men should have the sympathy and support of all who are desirous of seeing the mining industry flourish and go steadily forward. A point made in a leading article in our issue of last month has been endorsed by every meeting so far held, and that is, that there must be one law, and one only, for the whole Province, and that to frame regulations for one Mining Division which differ from those framed for another Mining Division, is a wholly undesirable state of affairs, which should be remedied in revising the present Act.

We have devoted much space in this issue to reviewing the two monographs just published, on, respectively, Asbestos and Mica, by the Mines Branch of the Department of the Interior. Both of these reports contain a mass of valuable information, and while, perhaps, if one were inclined to be captious, it might be urged that some unnecessary "padding" could advantageously, for the sake of conciseness, have been omitted, this defect, if it may be so termed, is an error on the right side rather than otherwise. In this connection we take the opportunity of offering our congratulations to the Superintendent of Mines, Dr. Eugene Haanel, for the work accomplished by the Mines Branch, under his direction, this year. In the past, it will be admitted, mining has not received from

Government its fair share of assistance and encouragement which its importance as a Canadian industry has warranted, but Dr. Haanel has already shown what can be done even with the limited facilities at his command. It is surely a beginning, but a beginning in the right direction. The electro-metallurgical experiments at Sault Ste. Marie may or may not prove economically valuable, but to question the practical utility of the tests before the results are arrived at is, at the least, premature, while there is no gainsaying the fact that the work initiated by the Branch along these lines is attracting the widest attention of scientific men throughout the world, and thus stimulating interest in the country and its mineral resources. In addition, too, three bulletins have been issued during the year, while all the arrangements in connection with the work of the Zinc Commission in British Columbia were made by the Mines Branch. That is one side of the shield; the other is not so satisfactory. We fear it is already well known that if not friction, at least there is a lack of cordial feeling between the Mines Branch of the Department of the Interior and the Geological Survey, which is also a section of the Department of the Interior. Thus when the Mines Branch issued the monographs on Asbestos and Mica, the Geological Survey immediately issued bulletins on the same minerals; or vice versa, it really doesn't matter which—except that the Geological Survey bulletins suffered somewhat in the comparison. But the absolute futility of this sort of thing must be apparent, and it is high time that it ended. Instead of antagonism, there should be harmony and co-operation, and surely an arrangement is possible by which this more satisfactory state of affairs might be brought about, for there is ample scope and work for both institutions. But the sooner the present chaotic condition of affairs in connection with the administration of the Geological Survey and other matters is settled the better for all concerned.

### THE PRINCIPLE GOVERNING INITIAL TITLE TO MINERAL LAND.

By DR. ROSSITER W. RAYMOND.

While I cannot pretend to possess such a personal knowledge of the new Temiskaming mining district in Ontario, the conditions of its industrial development, or the history and reason of legislative or executive regulations thereof, as would warrant me in the expression of a deliberate opinion or of detailed criticisms and suggestions, I have been much interested in the situation, as indicated in the columns of the *CANADIAN MINING REVIEW*; and I venture to offer a few remarks concerning one general principle, which seems to me to be involved.

*What proof of a valuable "discovery" should be required from a prospector upon public lands, as a basis for "possessory title?"*

In my judgment, the less, the better. The difference between the constitutional attitude of the United States Government towards its mineral lands and that of the Dominion, or of any Province of Canada, need not be discussed here. I am convinced that any modern government, whether State or Federal, owning mineral lands, and seeking to promote their development, whether in the general interest, and whether for the purpose of outright and unreserved sale, or of direct or indirect revenue, should specially encourage attempts to develop unpromising mineral territory.



If those claims only which offer good prospects at the beginning are recognized as entitled to possessory occupation, the inevitable result will be that, after all the "good things" have been thus appropriated, the Government will be left with the less inviting remainder on hand.

In discussing our United States law, I have gone so far as to advocate not only the recognition of locations, but even the sale of mineral land outright, without any proof whatever of a "valuable" discovery. But this extreme position need not be regarded here. The present practice under our Federal law is, that the Government raises no question concerning the validity of a location until the locator asks for a survey, as the first step of proceedings for purchase. The application for official survey is not made under oath. It may be signed by the applicant or his attorney, must contain the particulars of the situation of the claim and the title (by original location or by assignment) of the applicant, and must be accompanied by certified copies of the original (unsworn) location notice, and all later recorded amendments thereof. It will be seen that, so far, the locator has never made oath to any "discovery." On that point, he has simply given, in his original notice, a statement which, under the circumstances, can be regarded as only the declaration of his opinion that he has discovered a "lode." Under this initial declaration, he may hold his claim, unchallenged, for any number of years, provided he annually performs, upon the location, work to a certain amount, fixed by State or local authorities, but not less than the minimum fixed by the Federal statutes. Compliance with these conditions is deemed to be *prima facie* proof of the good faith of the locator, and of his continued belief in the prospective value of his discovery; and the longer the period during which he has satisfied the annual and other requirements attached to his possessory title, the stronger is the force of this *prima facie* proof.

Nevertheless, it constitutes only a legal presumption, subject at any time, prior to final sale by the U.S., to be overthrown by adequate contrary evidence. The question may arise through a conflict between two locations (both held under possessory title only) or between a location for which a patent has been applied and a prior location not yet the subject of such an application. Or a homestead or town-site may thus contest the validity of a mining location, occupying part of its territory. In such proceedings, the burden of proof is upon the challenger of the prior location, to show that it was not based upon a valid discovery. A patent of the United States, issued according to law for a given mining-claim, cannot be "collaterally" attacked; that is, its validity must be assumed in any proceeding except one, namely, a suit brought *ex relato* by the Government itself, to have the patent set aside, on the ground of fraud or illegal action.

It will be seen that, during the period of "possessory title," full opportunity is given for the assertion of the rights of other citizens, adverse to those of a locator, but as between the locator and the Government, the good faith and validity of his location are practically assumed. It should be added, however, that our Government is more liberal concerning its own claims than concerning those of its citizens. In the absence of any adverse claim, a patent may be properly issued upon less conclusive proof than would be required if the case were contested.

But while the validity of the U.S. mineral-land patent cannot be collaterally questioned, the extent of its grant is open to such inquiry at any time, and

can never be regarded as *res adjudicata*. For it conveys vague "extralateral rights" outside, and withholds similar rights inside, of the granted tract. These rights are obscurely and precariously contingent upon the course of the lode upon which the location was made, although they effect all other lodes "apexing" within the tract. The lode-locator, therefore, fixes the boundaries of his claim at his own peril. To secure the maximum advantage, he should ascertain the course of the discovered lode, and lay out his claim parallel therewith. Later changes of boundary are subordinate to the intervening rights of others. This requirement involves, inferentially, some knowledge of a lode; and consequently, we find that application for patent, after the official survey, must be made under oath, and must contain a declaration of a lode-discovery (though without any statement of its value); also, that the survey submitted therewith must indicate the point of discovery and the course of the lode—these particulars, however, being necessarily stated by the surveyor on the authority of the applicant. This is the first occasion on which the possessory owner (in the absence of any contest with other citizens) is required to make any oath whatever; and this oath, if not challenged, is regarded by the Government as a sufficient basis (other legal formalities and conditions having been satisfied) for the absolute and final transfer of all its rights in the tract described. If our Government did not, by such issue of a patent, surrender completely its ownership of the land and its mineral contents, its liberality in this respect would be certainly not less wise.

My cordial condemnation of the "extralateral rights" embodied in the U.S. statutes governing the sale of public mineral land, and my frank preference and advocacy of the principle of "square locations," that is to say, of the boundary of underground mining rights, of whatever kind, by vertical planes drawn through the surface-boundaries (according to the laws of Canada, Mexico, and, I believe, of all other civilized countries, outside of a limited part of the United States) is sufficiently well-known, I reiterate it here, simply in order to point out that this lamentable feature of our statute does not impair, but rather enhances, the force of my present argument.

The requirement, at any stage, of a sworn statement from a mining locator can only be based upon the legal responsibility involved therein—in other words, upon his liability to criminal prosecution for perjury, if he has sworn falsely. Now, such a sworn statement, made at the time of first location, could practically never be proved a perjury. A case is, of course, conceivable, in which a scoundrel might make a location upon utterly non-mineral land, upon which he had not found even a specimen indicating a mineral deposit. But frauds of that character are very rare, easily detected, and amply covered by the criminal law. What practically always happens is that the locator has found something which he professes to regard as part of a mineral lode. If he is a rascal, he takes all the more pains to make such a discovery, and to preserve proof of it. Hence, his oath merely certifies to his opinion that what he has discovered is a mineral deposit, such as the law requires as a basis for his location; and it cannot possibly be proved, except by his own confession that he did not honestly hold that opinion. Consequently, as I have already observed, I do not think an oath should be exacted from the prospector and locator at the first stage of his work.

But, if an oath be required, it is the height of superfluous un wisdom to require also the confirmation



thereof by the opinion of a Government inspector. The reasons for this opinion are so many that I cannot mention them all. Mining inspectors are not necessarily thorough economic geologists, competent to decide whether a surface-opening shows a lode of actual or prospective value. The most eminent of such experts could not make that decision with certainty, and would be, in other respects, very poor inspectors. And every one of them, if I may judge from my own field-practice of forty years, would frankly regard as, in some respects, superior to his own judgment, that of the practical miner who had "stayed by" his claim, watched its developments and minute indications continuously, and put his faith in it. Such an expert would be inclined to say to a prospector, at worst, "My friend, I don't see, as yet, any proof that this hole of yours is going to develop a bonanza for you. But all the great mines of the world have been discovered by men like you; and so long as you hang on, you shall not be stopped by any opinion of mine."

The chances are that an honest inspector would say the same, unless he observed clear indications of fraud. But such indications he would not observe; for fraudulent operators do not leave them lying about, to be detected at a glance. If the inspector himself were not honest or competent, of course his opinion would be valueless. If unfavorable, it would either be contested at heavy expense, or accepted with serious injury, to the prospector. And those who could afford to fight it would be the speculators, while those who must submit to it would be the poor but enthusiastic prospectors. On the other hand (and this is, perhaps, the most important consideration of all), a favorable report from the inspector, however obtained, would practically transfer to him the responsibility of the locator's declaration, and forever protect the latter against prosecution for false swearing. It is difficult enough to convict one man of perjury. The difficulty of convicting two is at least four times as great.

The deduction is self-evident. Either require no supplementary official opinion upon an alleged "discovery," or else require no oath from the discoverer, and leave the facts to be determined by official reports exclusively.

The unwisdom of the latter policy would be recognized by all mining engineers acquainted with the history of the development of mineral resources on either side of the International Boundary. It would harass a hundred honest prospectors, in the fallacious hope of detecting a single swindler, thus discouraging the one branch of enterprise which must needs be encouraged, and which promises most for the future prosperity of the State.

Questions of the taxation and regulation of the mining industry are indeed important, and may be solved wisely or unwisely. But before the mineral resources of a country can become the subject of such questions, they must be discovered; and this must be accomplished through the enthusiastic enterprise of individual explorers. For this particular and peculiar industry lives upon hope; receives, on the whole, scanty remuneration; and needs every possible encouragement. Whatever else is done or left undone, no unnecessary annoyance or burden should be laid upon the mining prospector. The notion that the Government should say to him, "We do not think you will succeed; therefore we will not let you try!" is self-evidently absurd. Let other remedies be provided, if necessary, for anticipated evils—not this!

New York, Nov. 24th, 1905.

## THE NEW GENERAL MANAGER OF THE DOMINION IRON & STEEL CO., Limited.

Mr. Frank Percy Jones, recently appointed General Manager of the Dominion Iron & Steel Co., Limited, is one of our young Canadians who promises to maintain the traditions of this country as the birthplace of "men of parts," as they say in Scotland.

Mr. Jones is the son of Mr. Chilion Jones of Brockville, therefore born to be a manufacturer and a hustler. After passing through the Brockville High School, now the Collegiate Institute, Mr. Jones took the Engineering Classes in the Royal Military College at Kingston. Leaving there in 1888 he spent the next five years in the works of the D. F. Jones Manufacturing Co., Limited, of Gananoque, giving about equal attention to the practical work of the mills and shops and to the general business of the concern.

During 1893 Mr. Jones was employed in the shops of the Canadian General Electric Co. at Peterborough, Ont., and on the 1st of January, 1894, joined the staff of the Nova Scotia Steel & Forge Co., Limited, as salesman. His success in that position brought him to the notice of the management of the Dominion Iron & Steel Co., when they were organizing their Sales Department in 1901, and he was enlisted in its service. Mr. Jones was appointed Assistant General Sales Agent in 1902, and in June, 1903, on the retirement of Mr. Buell, was made head of the Department.

In addition to developing the business of the Company with the various consumers of pig iron and steel in Canada, Mr. Jones has devoted especial attention to the study of the tariff in its relation to the Iron and Steel industries. His grasp of this subject is remarkable, and his opinions are respected even by those who differ from his conclusions.

After the dissolution of the connection between the Dominion Coal Co., Ltd., and the Dominion Iron & Steel Co., Ltd., and on the election of Mr. J. H. Plummer to the Presidency of the latter company, Mr. Jones became closely identified with the general management of its affairs, which was undertaken by the President on the retirement of Mr. David Baker, as General Manager, which office then became vacant. In addition to the direction of the Sales Department Mr. Jones undertook the supervision of the Purchasing and Warehouse Department, and also had charge of all the Company's traffic arrangements, chartering and managing its ships, and directing the operation of its Railway and Dock system. In the absence of the President Mr. Jones acted for him in all matters of general business.

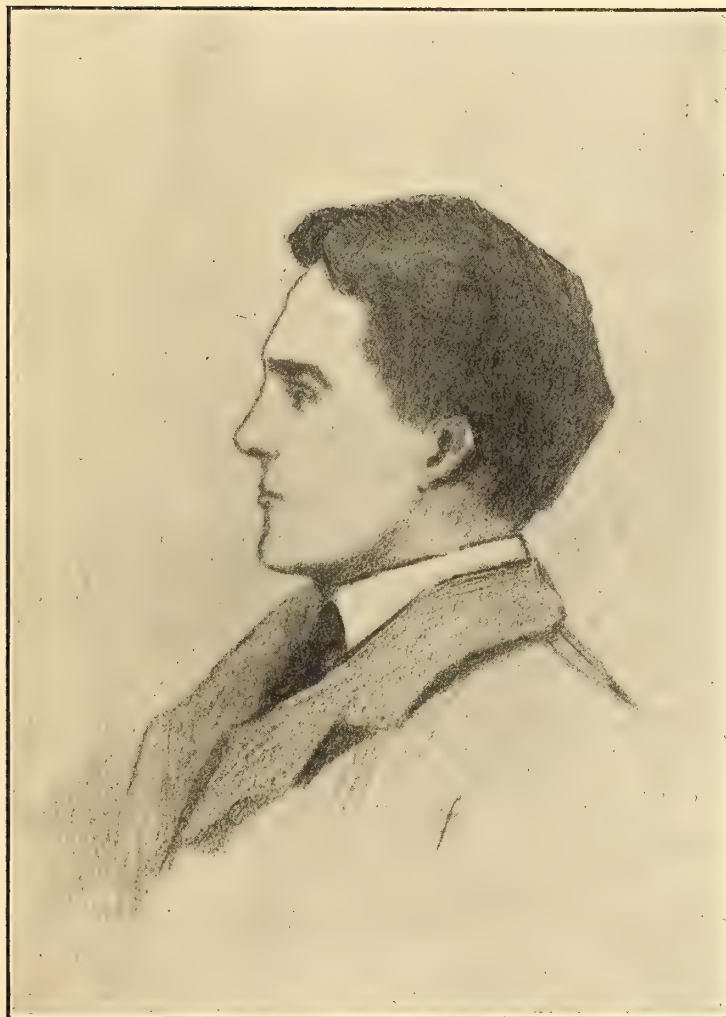
His recent promotion to the Management of the Company's affairs is therefore in the way of natural development, and is an unmistakable evidence of appreciation of his fitness for the position.

In the practical operation of the various parts of the Company's works, which for the past two years have been under the direction of Mr. Graham Fraser, Mr. Jones will be assisted for the present by Mr. C. H. MacMillan, formerly with the Tennessee Coal & Iron Co., and the English Westinghouse Co. of Manchester.

## GRAPHITE MINING AND CANADIAN POSSIBILITIES.

There appears at present to be a very brisk demand for crystalline graphite, both American and English dealers having visited this country lately with the





MR. FRANK PERCY JONES,  
New General Manager, Dominion Iron and Steel Co.

object of investigating graphite properties and working them for themselves. The enormous expansion of the steel and iron industry, both on the North American continent and in Europe, calls for a larger production of flaky graphite than usual, on account of the manufacture of graphite crucibles. It is reported that several large steel firms in the States, in Germany and in England are using the amorphous variety in the manufacture of some crucibles, owing to the irregular and insufficient supply of flaky material. Crystalline graphite for the most part is now produced on the Island of Ceylon; it is also produced in (Bavaria), in the State of New York and also in parts of Canada.

Canada has long been known as affording graphite of the flake variety; it possesses large deposits of this material in the Provinces of Quebec and Ontario, which, in extent and quality, are equal to those of New York State and Bavaria. In order to appreciate the possibilities of a Canadian graphite industry it may be mentioned that in New York and Pennsylvania crystalline graphite deposits are mined on a large scale which contains only 4% graphite, while the Canadian deposits carry from 7 to 20%, and offer in this respect a greater advantage for profitable mining than the United States deposits. The mines in New York owe their success to the methods of cleaning material in the mills.

Some years ago people ventured to predict a downfall of the natural graphite industry owing to the successful manufacture of artificial graphite at Niagara Falls, and it was even predicted that in a few years time a number of prominent mines in the United States and Canada would have to go out of existence. Nothing of the kind has yet happened and, while it is true that artificial graphite (of the amorphous kind) is suitable for certain purposes of manufacture (such as stove polish, foundry facings, paints, etc.), it is equally true that the crystalline variety, which is used so extensively in the manufacture of crucibles, cannot be made artificially, and, according to an expert, it is not likely that it ever will be.

The increase in the world's production of natural graphite for the last seven years has been very large; in 1897 it amounted to a value of \$1,900,000.00; in 1904 it was, approximately, \$4,500,000.00, and in 1905 it will very likely exceed \$5,000,000.00.

That Canadian crystalline graphite is equal to the best Ceylon product has been demonstrated by Dr. Carl Bischoff of Wiesbaden, Germany, the well-known expert on fireclay and refractory materials, and it has also been shown by Dr. Hoffman, of the Geological Survey at Ottawa, in a series of tests made in the year 1877.

The most practical proof is, undoubtedly, the actual manufacture of graphite crucibles from Canadian graphite by such firms as The Morgan Crucible Co., of London, England, Gauthier & Co., New York, and several German manufacturers. About 32 tons of refined flake graphite, coming from the Calumet graphite mines, have been so employed and the results have been so satisfactory that a large tonnage of the material could be sold. There is no doubt that with ample capital, careful and expert management, many Canadian graphite properties can be brought to a profitable state of production, and it is to be hoped that Canada will see, in the near future, a great expansion of the graphite industry commensurate with its extensive natural resources.

## THE ANNUAL REPORT OF THE HALL MINING AND SMELTING COMPANY.

During the month of November the printed report of the Annual General Meeting of the Hall Mining & Smelting Company was distributed to shareholders and others, and we summarize the essential features of the report for the benefit of our readers.

The directors' report is interesting inasmuch as it reveals the understanding between the Board and Mr. M. S. Davys, respecting the lease of certain portions of the property which has been renewed for a long period. This agreement between the Board and Mr. Davys began on the 16th of November, 1904, and will terminate on the 30th of June, 1907. Under this agreement Mr. Davys bears one half of all costs incurred, and gets one half of the net profits received, but gives his services without further consideration. We may remark in passing that although this agreement has been criticized by some few Canadian shareholders, as unduly favourable to Mr. Davys, we take an entirely different view, believing that but for Mr. Davys' intimate personal knowledge of the various properties on Toad Mountain, the Company would to-day be closed as an ore producer, and would be simply smelting ores purchased in the open market of British Columbia.

At the beginning of the financial year all the ore which could be mined without lowering the water below the level of No. 5 tunnel, had been extracted by Mr. Davys, and his lease had been surrendered. Mr. Davys visited England during the summer of 1904, and discussed with the Board the project of lowering the water to the 7th level, that the ore which is believed to exist between the 5th and 7th levels might be stoped out, and that prospecting work, in a different direction to that undertaken under the management of the late Capt. J. R. Gifford, might be continued. In November, 1904, Mr. Davys resumed his lease, under the new partnership arrangement which has been referred to, and began the extraction of ore in different parts of the old workings above the water level. In the spring of 1905 the surface showing, found by Mr. Richard White (working under a short lease, October 1st to November 15th, 1904) on the surface near the entrance of No. 1 tunnel, was exploited by Mr. Davys, and has since been continued with very satisfactory improvement, and with a widening of the ore body. This surface outcrop was that of a small stringer of good ore, which has since been found also in No. 1 tunnel. The grade of the surface ore was higher, averaging 83 oz. of silver and nearly 9% of copper for the 191 tons shipped to the smelter by Mr. White, than has since been obtained by Mr. Davys.

When this work was resumed in the spring by Mr. Davys, the width of the stringer steadily increased until the width of the shipping ore was fully 5 feet, and now something over 10 tons a day are being shipped from this streak to the smelter at Nelson. The general average of the ore taken out by Mr. Davys from this new streak has been 22½ oz. in silver and 4½ per cent. of copper. The report is indefinite as to the location of this stringer, whether on the foot or hanging-wall side of the main vein, but from the context it may be that this is a portion of the "North Vein," so-called, which, in 1898, showed a similar width and similar values in a crosscut driven from No. 3 tunnel. On this point we do not wish to appear certain, but if we are correct in assuming that it is on the north side there is every reason to believe



that the grade will continue and that the discovery is a new and permanent asset of the property.

In addition to the work on the new vein, Mr. Davys has opened a new shaft on the Kootenay-Bonanza, lying to the eastward of the old workings on the main vein, which have shown ore of a shipping grade, and of the future of which Mr. Davys is sanguine. So certain is Mr. Davys of the output of valuable ore from the new discoveries on the surface that he has advised that the unwatering of the mine to the 7th level should be deferred at present, and probably until the winter comes in and shuts off surface work. The directors state that under the partnership arrangement with Mr. Davys the total tonnage sent to the smelter has been 376½ tons, averaging in value \$22.00 per ton.

Work on the Emma group of mines in the Boundary country has shown a moderate profit, but the developments have been most satisfactory, proving the existence of a large body of good iron flux, carrying considerable values in gold, copper and silver. This Emma property renders the company independent of the market for fluxing ores, and from the sales made to outside smelters there is reason to believe that this iron flux will be a source of increased profits in the future. The sales of ore from the Emma mine to other smelters during the company's year were over 18,000 tons, over 7,000 tons being used at the company's furnaces in Nelson; the total output of the mine being about 25,500 tons. The company's one-quarter interest in the property yielded them a net profit for the year of \$2,849. The other three-quarters interest in this Emma group is owned by the British Columbia Copper Company of Greenwood, a corporation which owns and operates the Mother Lode mine and the large smelter at Greenwood. The management of this fluxing mine has been handed over to the British Columbia Copper Company, as the larger holder, but under an agreement fully protecting the interests of the Hall Mining & Smelting Company.

During the year the smelting works at Nelson have been pretty regularly in blast, and with results which are most creditable to Mr. Hedley, the efficient smelter manager. Like the Trail smelter, the works have suffered at times during the year through the uncertainty of the supply of lead ore, and with the recent closing down for a period of the St. Eugene mines, this uncertainty, we are afraid, may continue for a few months longer. In this connection we may state that this company has been considering seriously the question of improved processes for lead smelting, and, among others, that of the Huntingdon-Heberlein process for sulphide ores. In Mr. Hedley's report it is stated that the total valuation of the material smelted during the year has been \$1,100,000. The expenditure on maintenance and construction has been unusually heavy, by reason of the introduction of new improvements in the plant, the chief of which were for a Merton furnace and a bag house and flue extension. The total expenditure on maintenance and construction amounted to \$43,000.00. Mr. Hedley notes that the most important improvement about the furnaces has been a separator, designed by Mr. Harris, the chemist, which obviates, and does away with, the large and cumbersome settlers, previously in use, with the very beneficial results of much cleaner slags.

The report of the business manager, Mr. J. J. Campbell, is practically the same as the director's report, but it is in greater detail. The purchase of lead ores increased over the preceding year by 4½%, the number of mines from which ore was purchased being greater

by 25% than for the preceding year. The Hunter V and Double Standard mines, operated by the British Columbia Standard Mining Company, supplied during the year all the lime flux needed, and Mr. Campbell reports that the prospects of a permanent supply from these two mines is very good.

The report may be taken as quite satisfactory. The general account shows a balance of profit of £6,023 sterling, equivalent in round figures to \$30,000.00. Of this amount, it is fair to say, that the smelter is credited with over £5,000 stg. The general expenses of the company in British Columbia and London amounted to \$9,000.00, and the interest on the debentures to the very considerable sum of \$7,300.00. We are glad to note the better financial condition of this property, having always had a faith that it would eventually work out its own salvation and yield a profit commensurate with its importance. For many years this property has been one of the representative British Columbia mines on the London market, and also for many years it suffered by injudicious management, both in the Home office and in the Local office, but the changes which have been made are, we think, abundantly justified by the improvement in the financial condition of the property. In fact, although the public generally is unaware of it, the improved condition of the Hall Mines, Limited, is typical of the general condition in British Columbia, which Province to-day is doing better both financially and technically than it has ever done since 1893, and this despite the fact that there is no "boom" or speculative interest in British Columbian mining stocks.

#### PRODUCTION OF MICA IN CANADA.

In the monograph on Mica, issued by the Mines Branch of the Department of the Interior, an attempt has been made, and, we think, successfully, to get together in the form of a concise report all available data and general information dealing with this subject. The report deals chiefly with the commercial side of the matter, although due attention has been paid to the geological people. The exploitation of mica in Canada has been attended with many difficulties, on account of, principally, the great dispersion of the deposits throughout the country, their sporadic and often erratic occurrence and difficulties of transportation. Mica occurrences are confined more or less to pegmatite dykes in the Laurentian formation. These pegmatite veins or dykes occur throughout Canada in a number of places where the Laurentian formation is exposed. The best deposits so far discovered, however, are those of the Saguenay district below Quebec, and in addition to these deposits are found to the north of Ottawa, in the vicinity of Mattawa, at several places in Ontario, and also at Tete Juane Cache and near Golden in British Columbia. The principal discoveries in the Saguenay district were made in the townships of Bergeronnes, Tadousac and Escoumains. In the County of Ottawa the Villeneuve mine was at one time regarded as the most important white mica property in the country, and was worked from 1884 to 1898. Between the years 1884 and 1888 thirty-five thousand pounds of cut, marketable sheets were produced, one crystal weighing 281 lbs. and measuring 30 x 22 inches, having yielded \$500.00 worth of merchantable mica. In Ontario several deposits of promise have been discovered in the Township of Aylwyn and in the Parry Sound district.

The status of the industry in Canada is described in chapter V of the bulletin.



Canadian mica mining was still in its infancy ten years ago. It has now assumed such proportions as entitle it to a prominent position amongst the mineral industries of the Dominion. In its early days mining was carried on in a spasmodic manner, that is to say, deposits were only tested superficially and as soon as a little dead rock threatened to cut off the mica the mine was abandoned. Many of the smaller producers worked intermittently, taking out the mica which outcropped on their farms and stopping work with the falling market or when the deposits were, in their opinion, exhausted. These erratic methods, and constant shifting of operations from one place to another proved altogether too expensive. A new era has set in, a more practical system has been adopted and development work in mica mines is now pursued in depth. And further, while formerly the mica industry was in the hands of individual operators, having in most cases only a very limited amount of capital at their disposal, to-day powerful companies owning extensive areas of mica lands have started operations on a large scale. To these companies is due the erection of substantial cutting establishments in the centres of the mica districts. These large concerns, realizing the immense importance of the qualities exhibited by the Canadian mineral, begin by testing their properties in the most systematic manner, both by the use of the diamond drill and by exploration work on the surface. There is no doubt that a great many properties, either on account of the lack of experience or unscrupulous manipulations of the operators, have been condemned and abandoned, whereas they should, with efficient and honest management, have continued to yield a large and profitable output. The machinery installed by the large companies, compared with that of former years, is of a more substantial nature, and is erected with a view to deep sinking and extensive operations. Large sums of money have thus been spent in advance of actual production.

Formerly when deep shaft mining was attempted, all the mica within reach, practically all that was visible, was mined without a thought being given to reserves, but in the last few years several mines, especially those in the Ontario section, realizing the immense importance of such an ore reserve in case of a sudden exceptionally large demand for mica, have carried on operations with this important object in view and the result is that these mines have now large reserves ready to be stoped at any desired time. The advantages of such a policy are obvious.

As to the future possibilities of the productive mica fields of Canada, there is no doubt that the future outlook for the production of a large tonnage is very bright and if Canada should ever be called upon to furnish the world's supply the mica fields of Ontario and Quebec could soon be prepared for such an emergency.

There are at present employed in the mica industry 550 persons, but nearly all the mines and mica-cutting establishments are only employing about half the usual number of persons owing to the temporary slackness of the demand, probably due to last year's over-production. For instance, the General Electric and Laurentide Mica Companies usually employ in each of their cutting establishments over 300 hands, whereas at present they employ only half that number. The same remark applies to the larger mines like the Lacey, Blackburn, Wallingford, Laurentide and others. The wages paid last year amounted to a total approximately of \$120,000. It is estimated that the total outlay for plant, including buildings and all acces-

sories, employed in the mica industry amounts to approximately \$160,000.

The total value of the mica produced in Canada up to the beginning of 1904 is placed at approximately two million dollars.

Most of the mica is absorbed by the United States, which placed a duty of twenty per cent. *ad. val.* and six cents per pound on thumb trimmed mica. Efforts have been made in recent years to create a market for the Canadian mineral in England in competition with the East Indian product and the statistics furnished by the Department of Trade and Commerce show that Great Britain has commenced to take a large part of our production.

#### EXPORTS OF MICA.

| Year.      | To<br>United States. | To<br>Great Britain. |
|------------|----------------------|----------------------|
|            | lbs.                 | lbs.                 |
| 1901 ..... | 761,991              | 211,833              |
| 1902 ..... | 868,645              | 115,388              |
| 1903 ..... | 729,489              | 653,081              |

#### PRICES.

##### *Muscovite.*

Prices for commercial muscovite fluctuate considerably, depending on the transparency and perfection of the sheets.

A dealer quotes the following prices for medium quality Canadian muscovite:—

|                                        |          |
|----------------------------------------|----------|
| 1" x 3" thumbtrimmed, per pound. . . . | 12 cents |
| 2" x 3" " " " " " " " " " " " "        | 25 "     |
| 2" x 4" " " " " " " " " " " "          | 40 "     |
| 3" x 5" " " " " " " " " " " "          | 75 "     |
| 4" x 6" " " " " " " " " " " "          | 100 "    |

##### *Phlogopite.*

The prices paid for Phlogopite of the different sizes naturally fluctuate considerably and much speculation is manifested amongst mica dealers. The following table gives the present prices paid by a large firm:—

| Size. | 1" x 3", | 10 cents per pound, thumbtrimmed, (not cut) |
|-------|----------|---------------------------------------------|
|       | 2" x 3", | 22 " " " "                                  |
|       | 2" x 4", | 30 " " " "                                  |
|       | 3" x 5", | 55 " " " "                                  |
|       | 4" x 6", | 75 " " " "                                  |
|       | 5" x 8", | 100 " " " "                                 |

In this connection it is interesting to note that Sir William Logan in his report of progress for 1863 mentioned a sale in London of several hundred weights of large, selected mica crystals, taken from a locality north of Burgess, and fit for splitting into thin plates. The price was two shillings per pound, while from four pence to seven pence was given for inferior qualities. There was also a large demand for smaller sizes and for the refuse. The former, among other uses, was employed in making letters for window signs. Ten shillings a hundredweight was offered in London for fifteen or twenty tons of such material.

There are altogether seven mica cutting establishments in Canada, six of them are located in Ottawa and one in Kingston. In busy times these factories give employment to approximately 800 persons. The factories in Ottawa are operated by: The Laurentide Mica Company, The General Electric Company, Blackburn Bros., Wallingford, Munsell and Sills-Eddy and that at Kingston by Kent Bros.



## ASBESTOS MINING IN CANADA.

The preparation and compilation of this important monograph, issued by the Mines Branch of the Department of the Interior, was entrusted to Mr. Fritz Cirkel, M.E., of Montreal, who appears to have carried out the work with commendable care and zeal. The report is comprised in a volume of upwards of 200 pages, handsomely illustrated with diagrams and photographic reproductions, and includes chapters on the following subject:—

Physical and chemical properties of the mineral; geological occurrence and distribution in Canada; the mining of asbestos; methods in vogue and machinery employed; dressing, hand sorting and mechanical treatment; cost of production, market and prices; status of the industry; statistics; description of mines and prospects; commercial application; occurrence in foreign countries; extract of laws governing the prospecting for and mining of the mineral in the Province of Quebec.

Asbestos was first discovered in Canada in the Des Plantes River region between St. Joseph and St. Francis villages, in the Province of Quebec, in 1862, but all attempts to work the deposits profitably at that time failed, and nothing was done until 1877, when new discoveries were made in the serpentine hills of Thetford and Coleraine. Prospecting was much facilitated by the fact that the whole of this region had been swept by forest fires, and considerable areas were acquired both at Thetford and Black Lake, near the line of the Quebec Central Railway. In 1878 mining operations were commenced on a small scale and 50 tons of material produced. Some years later shipments made to London created, on account of the excellent quality of the asbestos, a considerable sensation, and in consequence of extensive tests and investigations capital became largely interested in the exploitation of the new fields. During the ten years following, the industry developed at a rapid rate; the mines were worked on an important scale, and prospecting became active in the surrounding country. But with the primitive methods employed of hand extraction only, the very rich ground could be made to pay, and many mines producing but a small percentage of the higher grade product were forced to shut down, and this, accentuated by over production and a consequent fall in prices caused a depression in the industry from which it suffered for some time in the nineties. Conditions, however, were permanently improved later by the introduction of machinery to replace handcobbing, and to-day every mine in the district is equipped with a complete milling and fiberizing plant, by which means all the smaller fibre, at one time left in the rock and thrown on the dump, is now saved. Thus, there are now working in the district sixteen mills, having an aggregate capacity for the treatment of 3,500 tons of asbestos rock daily, and it is reported that both the capacity of the mines and mills is to be materially increased in the immediate future. As Mr. Cirkel very properly puts it, the asbestos industry is a striking example of what human ingenuity, if applied in the right direction, may accomplish. It demonstrates that in order to attain success it is necessary "to strive, to seek, to find and not to yield."

Asbestos, in its commercial form, is, we are told, a product of at least two distinct minerals, both having in common only a fibrous structure and more or less fire and acid proof properties. These minerals are:— (1) amphibole, or hornblende asbestos (tremolite and actinolite) and (2) serpentine asbestos (amianthus) and Canadian chrysotile asbestos. Both possess

heat resisting properties to approximately the same degree, but the chrysotile variety possesses greater strength of fibre and can alone be used satisfactorily when this character is desired as well as non-conductivity of heat. The actinolite deposits occur in the Township of Elzevir, in Hastings County, where mineral has been mined since 1884 near the village of Actinolite. Operations having been carried on by the International Asbestos Company and the Joseph James Company. It is claimed that from 30 to 40 per cent. of all the rock mined is treated in the mill, and about 10 per cent. extracted as fibre. The market for this mineral however is limited.

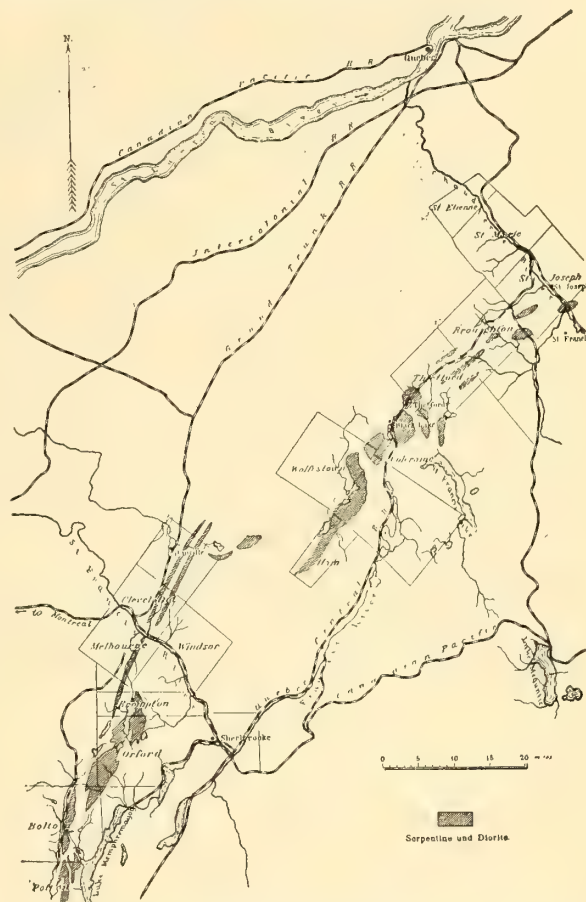


Fig. 1.—Map showing distribution of serpentine in Eastern Townships of Quebec.

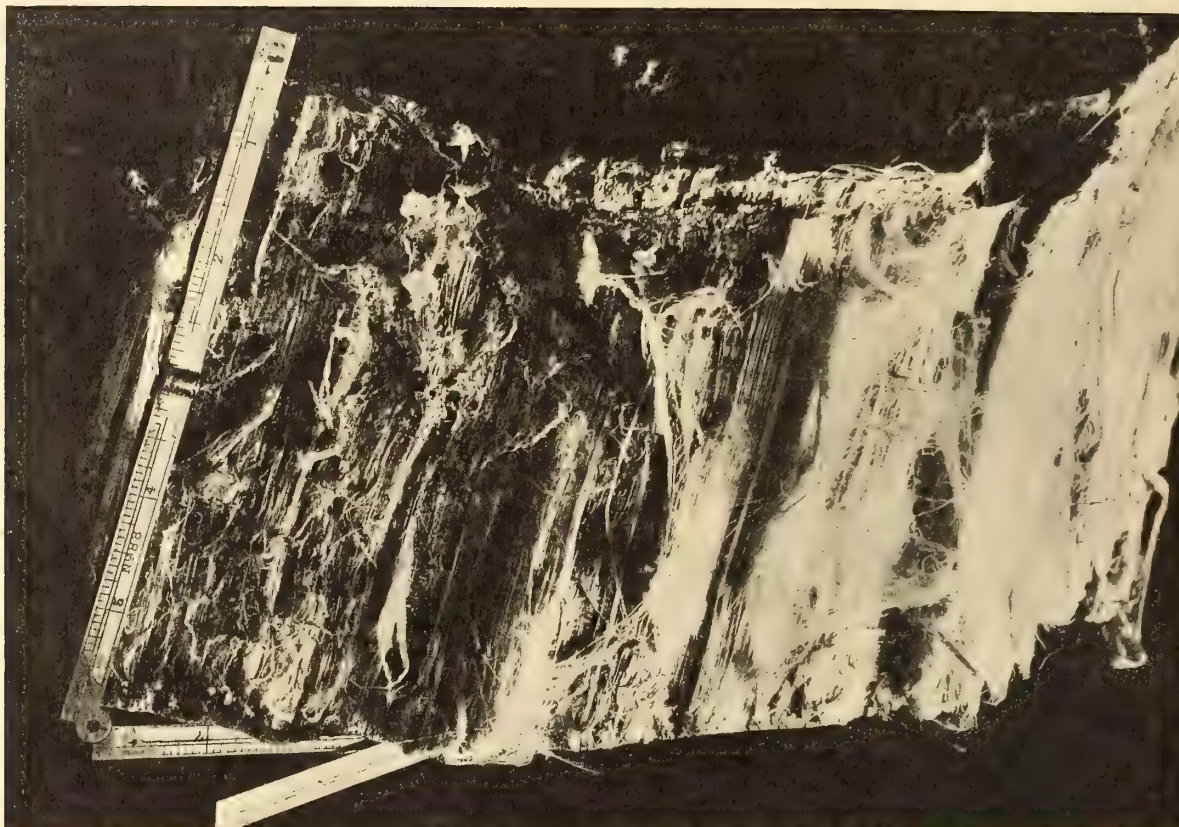
Chrysotile asbestos is a fibrous form of serpentine and the Canadian variety possesses in an essential degree those qualities which make for economic value, namely, length, fineness and elasticity of fibre, tensile strength, flexibility, and power of fire resistance. It has also a great adaptability for spinning. The hardness of the Canadian chrysotile is from 3 to 3.5 Mohs' scale, and its specific gravity 2.2 to 2.3. An interesting comparative table, showing the composition of Canadian fibre, as compared with the Italian, is given in this report, from a statement prepared by Prof. J. Donald, as follows:—

|                         | ITALIAN FIBRE | CANADIAN FIBRE     |                       |                      |
|-------------------------|---------------|--------------------|-----------------------|----------------------|
|                         |               | Cambrian, Thetford | Chrysotile, Broughton | Laurentia, Templeton |
| Silica . . . . .        | 40.30         | 39.05              | 40.87                 | 40.52                |
| Magnesia . . . . .      | 43.37         | 40.07              | 41.50                 | 42.05                |
| Ferrous Oxide . . . . . | 0.87          | 2.41               | 2.81                  | 1.97                 |
| Alumina . . . . .       | 2.27          | 3.67               | 0.90                  | 2.10                 |
| Water . . . . .         | 13.72         | 14.48              | 13.55                 | 13.47                |
|                         | 100.53        | 99.68              | 99.63                 | 100.10               |



The report divides the occurrences into two classes, (1) The species belonging to the Laurentian formation in the Templeton area North of Ottawa, in connection with the serpentinous limestone and (2) the asbestos of the Eastern Townships, more particularly confined to the serpentine area of the mountain belt which extends from the boundary of Vermont to the extrem-

covered with heavy humus and forest growth prospecting is very difficult, and unless the forests are destroyed by fire, and the soil removed as was the case in Black Lake and Thetford, it is questionable whether the presence of the mineral in paying quantities will ever be established. The geology of the Thetford Black Lake area is thus described in the report.



Canadian Chrysotile Asbestos.

ity of Gaspé peninsula. The deposits in the Laurentian need not be discussed at length since so far it has not been found profitable to work them. The distribution of serpentine, meanwhile, in the Province of Quebec is included in the following area and shown in the accompanying map, (1) the area covering the Gaspé peninsula, (2) the Thetford Black Lake area, (3) the Danville Orford and Potton area. Mr. Cirkel goes very thoroughly into the geology and general features of the serpentine in these areas, the most important

#### THE THETFORD—BLACK LAKE AREA.

*Geology and General Features of the Serpentine.*—The workable asbestos deposits of this area are confined to the serpentine belt near Black Lake and Thetford and to a small detached area near East Broughton station.

The serpentines of the townships form disconnected masses, generally of small extent in the great series of slates, schists and diorites designed as a part of the Cambrian formation (Fig. 3). Occasionally they as-

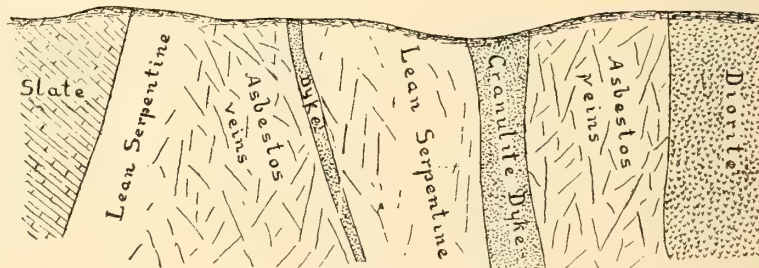


Fig. 3—Profile of Asbestos-bearing formation at Black Lake and Thetford.

field of which, from an economic standpoint, is that of Black Lake and Thetford, where a great part of the serpentine is asbestos-bearing in commercial quantities, and here the mineral is mined on an extensive scale. In the third, or southwestern area, asbestos has only been discovered in considerable quantities at Danville, and it is pointed out that as this area is

sume such proportions as to form mountain ridges, as may be noticed in Black Lake, where most of the productive mines are located on the great serpentine ridge which attains a height of 900 feet over the track of the Quebec Central Railway and strikes in a northerly direction through the country. The serpentine masses are unquestionably an alteration product



om an olivine diabase or gabbro, which forms also prominent hill features in this area.

All the rocks in the district from Vermont north to the St. Lawrence river have been subjected to a great series of folding and disturbances\* and evidences of this effect may be seen all through the asbestos region in the decidedly slaty and schistose structure of parts of the serpentine masses. The rocks in Thetford and Black Lake, however, although exhibiting to some extent faults and slickensides have withstood the strain of pressure and are of a more massive character.

Slickensides and faults as a result of these movements are very frequent throughout the serpentine region and in some places have cut off entirely working veins, presenting a barren wall for a time. Sometimes, however, veins of good asbestos are concealed by the soft slippery serpentine with which they are covered and it is necessary, therefore, that the miner should examine these walls very closely before he is fully certain that they are barren.

In many cases these dikes have shattered and altered the rock in contact; the latter appears to be highly fissured and at places large accumulations of asbestos veins can be noticed, apparently indicating that the intrusion of these dikes has exercised some influence in this direction. Sometimes these dikes cut off the work entirely and very often a face of good asbestos veins, but good ground is generally found by driving through the dike mass.

*Characteristics of Asbestos veins.*—The veins in the asbestos bearing rock occur without any special arrangement, intersecting each other and the mass generally in every direction, but generally forming straight lines. (Fig. 4). Sometimes they split up in several smaller veins or coalesce and form a larger vein. Certain peculiar arrangements, however, are noted in some of the areas, as at the King Bros. mine in Ireland\* where the serpentine appears to be regularly stratified almost in the manner of sandstone or quartz in layers dipping to the northwest and the veins of asbestos

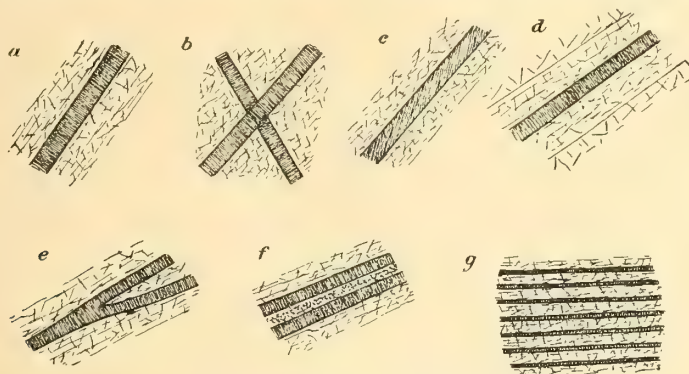


Fig. 4.—Typical Asbestos Beds

- (a) Regular vein.
- (b) Crossing of veins.
- (c) Drawn out vein in fault or slickenside.
- (d) Seamy parting containing vein in middle.
- (e) Forking of vein.
- (f) Two veins divided by small seam of chromic iron and serpentine.
- (g) Ribbon like arrangement of small veins.

The serpentine exposed in different sections of this area varies considerably in character. Some of the rock is hard and silicious and dry looking, as in some portions of Black Lake, Ireland and Wolfestown and contains no asbestos. Sometimes it exhibits a tar-bushed yellow colour and in most cases imperfect, stiff or harsh fibre is found. Frequently seamy partings can be observed (Fig. 4d and Plate III), crossing the rock in every direction and while it is true that in a great many of them no asbestos can be found, still it appears that these indications form characteristic features of the presence of the mineral in some of the mines. In certain portions of the belt these seamy partings are quite numerous and by some prospectors are supposed to indicate the presence of asbestos veins. Even in the mining district of Black Lake and Thetford there are large portions of the serpentine belt which do not contain asbestos in payable quantities. The rock carrying good asbestos veins is generally of a gray weathered, dark green or gray green colour. It contains to some extent numerous particles of iron ore, both magnetic and chromic and as a rule serpentine rock of a black, hard, chippy aspect does not promise well for the presence of asbestos.

The serpentine is often cut by dikes of granite, which can be noticed in most of the mines in Black Lake and in Thetford. They range in size from small bands of one and two feet up to large intrusions of 50 and 100 feet in width and some of the grey and reddish varieties form conspicuous hills between the villages of Thetford and Black Lake.

apparently follow what in sedimentary rocks would be regarded as bedding planes. In several other places the veins cut the rock in an almost horizontal direction and when found in a knoll can be traced across from one side of the hill to the other, nearly on the same plane, but as a rule the veins are irregularly placed.

The thickness of the veins varies from mere threads up to several inches, but it may be said that the largest bulk of the asbestos mined is between one quarter and one half inch in length. The longer fibre is very often divided in the middle by a seam of serpentine carrying magnetic or chromic iron ore. As a rule, in most of the mines the asbestos can be easily separated from the rock, but in some veins the fibre appears to be frozen to the rock, its complete separation being very difficult.

The veins are sometimes displaced by the action of faults and slickensides in the serpentine, giving the impression that the fibre is of considerable length, whereas when closely examined it is found that the veins carry fibre of the usual length, but drawn out along the fissures. (Fig. 4c). Sometimes a long, woody fibre is observed deposited in a fissure between two rock portions. This woody material usually termed hornblende by the miner is in reality a picro-lite and can be noticed principally in the mines at Thetford and East Broughton.

A peculiar occurrence of asbestos is noticed in the Megantic mine at Coleraine. Here the serpentine

\*Geological Survey Report, 1890-91, page 20 S.

\*Dr. Ells, paper read before the Asbestos Club, Black Lake February 19th, 1981.

for several feet is laced with small, minute veins of asbestos one-sixteenth and one-quarter of an inch in thickness, giving the rock a ribbon-like structure. This same mode of occurrence can also be noticed in some mines of Black Lake.

#### THE EAST BROUGHTON AND DANVILLE AREAS.

A small detached area of serpentine occurs in East Broughton. The serpentine is enclosed between a highly quartzose slate, probably of Cambrian age. Its largest width is about 700 feet and its general trend about  $20^{\circ}$  east of north. (Fig. 5). Most of the serpen-

of serpentine. Much of the fibre is short, but it is of an excellent quality, being of a grass-green colour when freshly broken. Occasionally fibre measuring two inches in length is found. Large sheets of ligni-form serpentine of white and green colour are found along fracture lines in the serpentine, resembling picrolite, which is sometimes so soft that it can be cut with a knife.

Another detached mass of good serpentine occurs near Danville. This whole area is much affected by faults and some of the larger veins are cut off by intrusive dikes. However, the quantity of fibre appears to

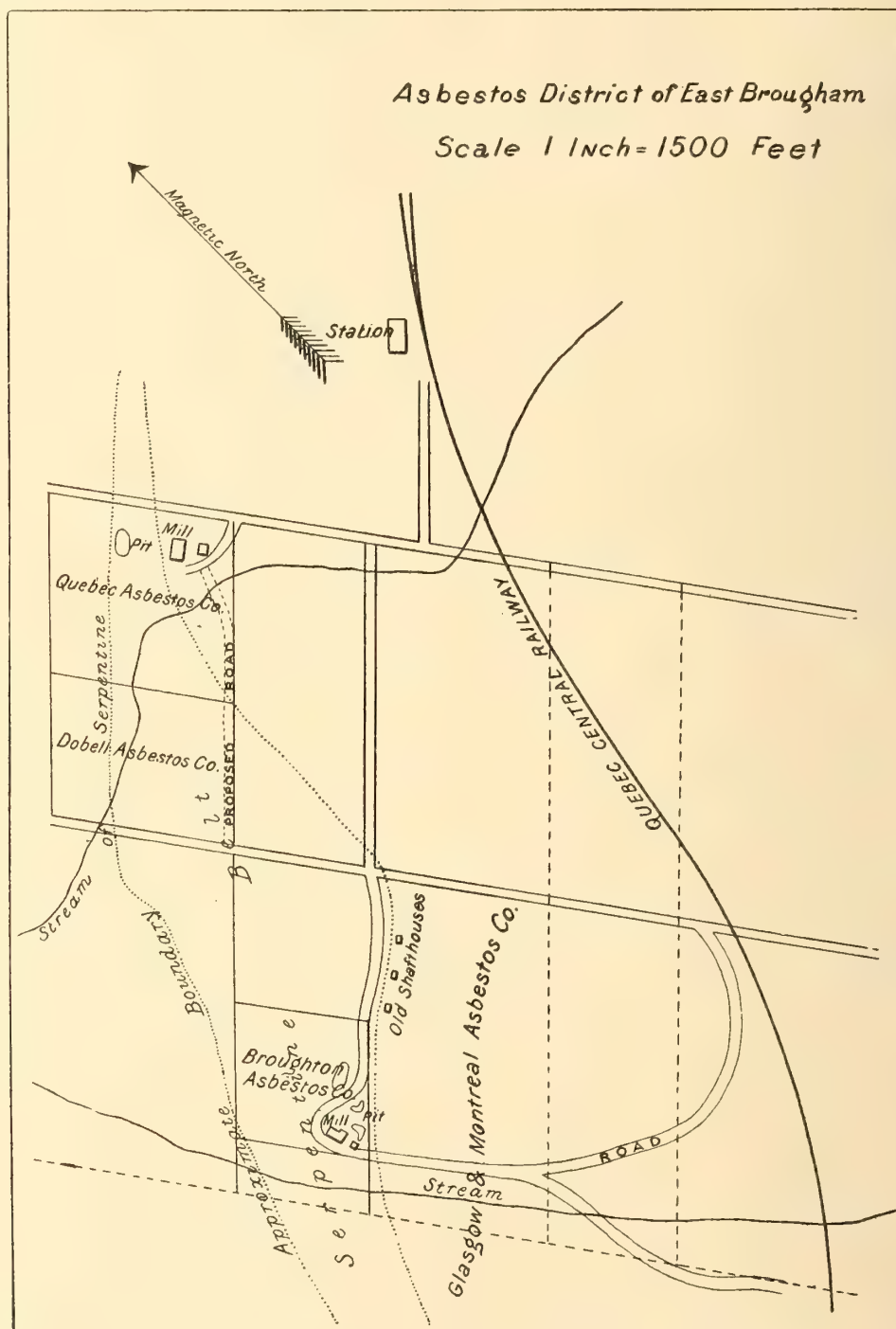


FIG. 5—Asbestos District of East Broughton Scale 1 inch = 1500 feet.

tine is completely shattered, is much softer than the serpentine of Black Lake and Thetford and is easily mined. The asbestos forms small gashy veins along the cleavage planes, is sometimes crushed and seems at places to be disseminated through the whole mass

be large and the general conditions for mining excellent. Asbestos up to one-half inch and longer occurs plentifully, while the whole of the serpentine is impregnated with very fine, short fibre, representing a first class milling material. It is stated on good authority



that between seventy and eighty per cent. of the total rock mined goes through the mill.

Most of the mining of asbestos in Quebec is carried on by open quarry work. The soil which covers most of the asbestos-bearing areas, to a thickness varying from a few feet to 25 feet, is first removed, and in the case of one property a steam shovel has been utilized for this purpose. In the smaller mines the quarries have generally an irregular shape, following the trend of the asbestos-bearing zones, but in the larger properties where a careful study has been more fully made of the location of the asbestos-bearing and lean rock quarries are generally rectangular in form, and the rock is taken down in a series of benches, stopes and terraces, varying from 5 feet in the highest level of the pit to perhaps 30 and 40 in the deepest part. Blasting is done by arranging bore holes in rows and as nearly as possible parallel with the longest free side, the depths of the holes ranging between eight and ten feet. Ingersoll and Rand types of rock drills, with  $3\frac{1}{4}$  cylinder and a stroke of  $3\frac{3}{4}$  inches are also employed. The expense for explosive per ton of rock broken is about 3 cents per ton. After the blasting the material is hand sorted, the long asbestos fibre and rock containing the same being sent to a cobbing shed, while the milling material, or rock containing shorter fibre, and the fine material and scrapings of the pit, are sent to the mill, the fines passing first through the dryer. Boom derricks are employed in a few of the smaller mines, or where dumps are worked over, but in most cases where mining on a large scale is in progress, heavy boom and cable derricks are in use. The position of the cable derricks is determined by the location and number of working points in the pit, and changes with the shifting of operations. In most of the larger mines the motive

inch in length, while at other properties a No. 2 grade is also produced measuring from five-sixteenths to three quarters of an inch in length. In hand cobbing the rock is broken up by hammers, and the long fibre screened by sieves with 3-16" holes, and sent to a finishing shed, while the screenings and the rock containing shorter fibre are delivered to the mill. In the finishing shed the No. 1 fibre is cleaned by a sieve with 9-16" holes and the No. 2 fibre by a sieve with 3-8" holes, in order to get rid of all adhering rock particles. The crude fibre is then packed in 100 lb. bags ready for the market. Cobbing is generally done by contract at a price varying from 30 to 35 cents per cwt. The fines from the pits and cobbing sheds contain a considerable quantity of moisture, and are dried by exposure to the air by means of steam pipes and by rotary dryers.

The mechanical dressing of the asbestos-bearing rock consists in outline of a preliminary crushing in rock breakers of different type, both the jaw-breaker of the Blake pattern and the gyratory breakers of the Gate pattern being used. These machines simply reduce the large rock preparatory to fine crushing by rolls. The secondary crushers are of two types—those crushing by direct pressure as exemplified by the well known type of Cornish rolls, and those comminuting the rock by centrifugal force as typified by the beaters and the well known "cyclone" mill. Neither of these machines need be described in detail, it is only necessary to say that the matter of size depends upon the tonnage requiring treatment, and the choice between a smooth surface roll or a corrugated roll is a matter of personal choice and of requirements of the fibre in one or two mines. The cyclones effect the liberation of the fibre from the rock, but it becomes necessary to break up the veinlets of asbestos

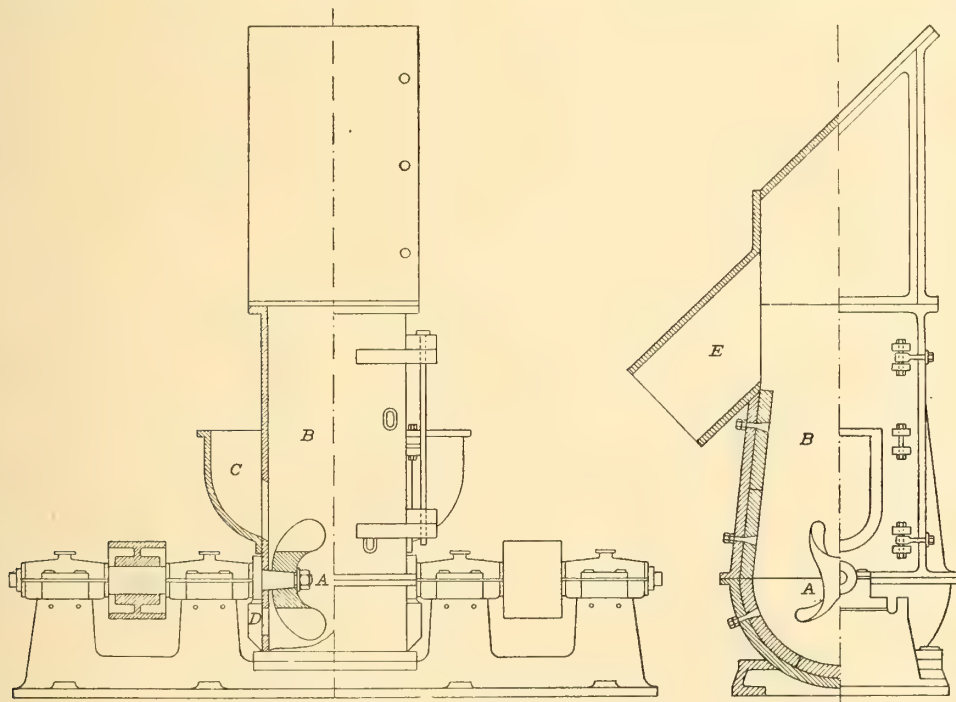


Fig. 6.—Cyclone Fiberizer as manufactured by Laurie Engine Co.

power for actuating rock drills, hoists, etc., is compressed air.

Chapter III. of this report deals with the dressing of asbestos for the market, which includes hand dressing and mechanical dressing. Hand dressing is confined to the cobbing of No. 1 and No. 2 grades only; some mines make only No. 1 crude, measuring over  $\frac{3}{4}$  of an

into the fine filiform fibre of the clean mineral. For this purpose fiberizers of different type are used, the commonest one being in the form of a hollow cylinder in which revolves a shaft furnished with arms, or knives, which strike the mineral crush the lumps and fiberize the compact asbestos. The cyclone machine as we have already said, is now well known in the

market, and its efficiency has been repeatedly demonstrated. The only objection to the cyclone is that it destroys a portion of the fibre by its violent action, but as it does its work better than any other apparatus it remains the chief factor in separation in spite of the losses incurred. Its principle is that of two screw propellers revolving in opposite directions in an enclosed case, the speed of the revolution varying from 2,000 to 2,500 per minute. The fine fibre is drawn from the apparatus by a suction fan.

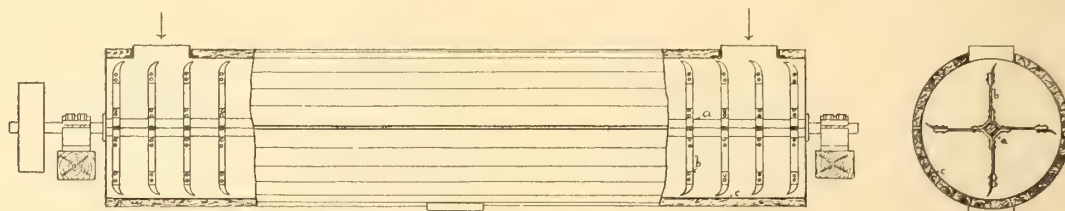


Fig. 7.—A Cylindrical Fiberizer.

Where the mill tailings are sufficiently valuable they are ground to a fine powder for use in plastering. The fiberized mineral drawn from the mills by suction fans is deposited and collected in chambers. Accessory to the pulverizing and grinding machinery are the screens conveyors, etc., which do not need particularizing to our readers.

The cost of labour employed in the mills varies. At one of the larger plants the cost per ton of milling rock equals 29 cents, or \$3.11 per ton of fibre. In another mill of larger capacity these costs are reduced to 25 cents and \$2.56 respectively.

tion, market and prices, statistics and status of industry. In respect to the former an example has been taken of a mine which has been working for some years on fairly good ground, operating mill and mine by day shift only, and treating between 80 to 90 tons of rock, all grades produced averaging about 9.5 per cent. of the rock milled. At this property the pit foreman receives \$2.00 per day, engineers \$1.75, air drillers \$1.75, blacksmiths \$1.75, derrick men and miners \$1.25. At the mill the foreman is paid \$2.00 per day

and the mill wright \$4.00, and other labour from \$1.25 to \$2.00.

The operating expenses are:—

|                                      |                   |
|--------------------------------------|-------------------|
| Per ton of total rock mined. . . . . | 53 cts.           |
| Per ton of milling rock . . . . .    | 83 cts. (mining)  |
|                                      | 80 cts. (milling) |
| Per ton of asbestos. . . . .         | 8.86 (mining)     |
|                                      | 8.55 (milling)    |

or total cost of production per ton of asbestos mined and milled \$17.41. Of this item \$10.13 is charged against wages and \$4.19 against power. Were the



Fig 8—A Typical Mill.

So far as known the lowest percentage of asbestos milling rock of the total rock mined is 20 per cent. and the highest 70 per cent., but the average may be placed at from 30 to 60 per cent. of all the rock mined. Chapter IV of the report discusses the cost of extrac-

capacity of this property increased to 300 tons of milling rock, producing from 25 to 30 tons of asbestos, it is estimated that these costs might be lowered to \$14.50 per ton of asbestos produced.

Canada is now the largest producer of asbestos in



the world, the value of last year's output being valued at \$1,167,572.00. This is the largest output that

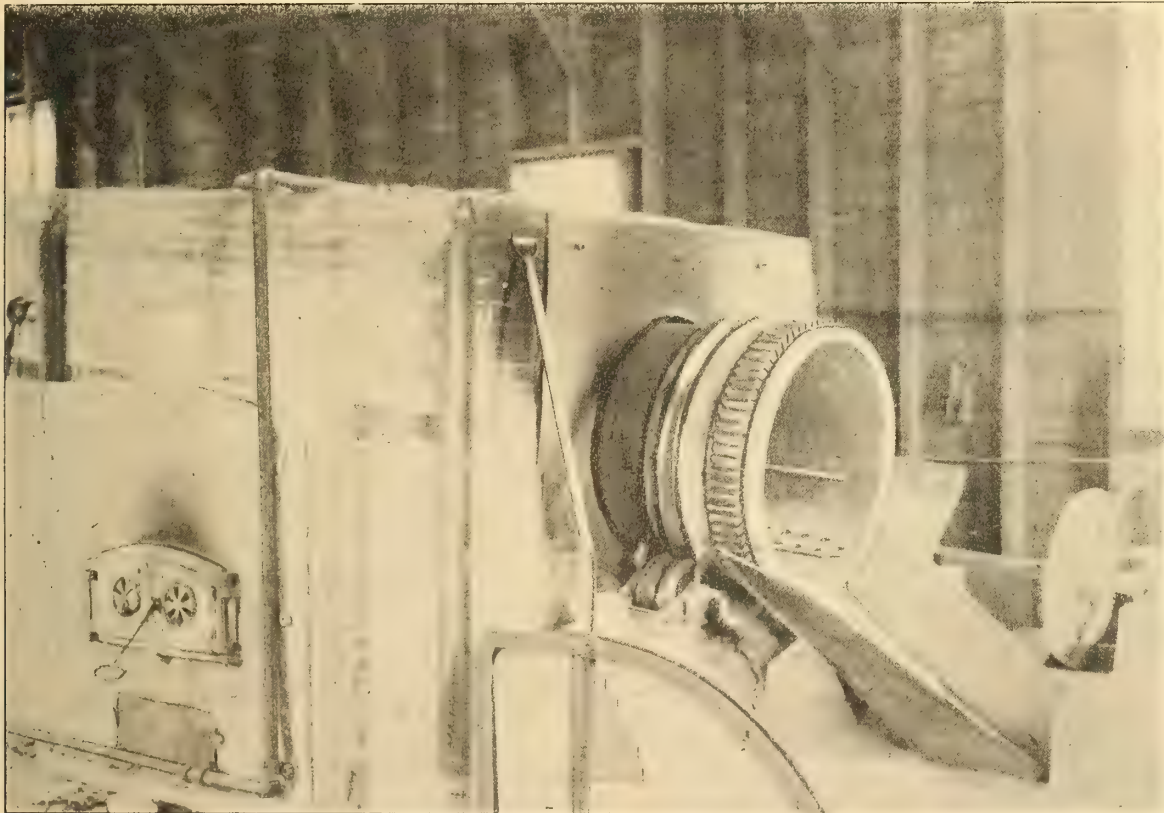


【A Bunch of Fiberized Asbestos, ready for market.

has ever been made by the Canadian mines. The prices per ton at present are for No. 1 crude from \$175.00; to \$200.00; No. 2 crude \$110.00 to \$125.00; fibre No. 1

Since the introduction of mechanical separation which has enabled the operators to extract the small fibre from the large dumps covering in some localities valuable ground, the industry, as a whole, has taken an altogether different aspect, in fact it has been revolutionized in every direction. Many mines which were working on poor ground and could not produce the better qualities have had a chance to realize on the abundant quantities of small fibre, while the larger companies could turn the immense dumps into realizable assets, thus adding considerably to their yearly dividends. Since the year 1896 the demand for fiberized asbestos has steadily increased from year to year owing to the numerous new applications of the lower grades. Additions to the already existing mills have been made, new and more modern mills designed and erected, the capacity of the mining plants increased and the result is, that we possess to-day an industry which is one of the most prominent economic resources of the country. In order to appreciate better the rapid advance made for the last eight years, it may be mentioned that, in 1896, only six mills were in operation, with a total maximum capacity of approximately 900 tons, while to-day there are not less than sixteen mills in existence, with a combined maximum capacity for treating 3,500 tons of asbestos rock per day, and, if all the plans of the larger companies working in the district are realized, the capacity of the industry will be increased during the year 1905 to 4,500 tons of asbestos rock per day. It must be mentioned, however, that some of the smaller mines work only intermittently and that a steady production of asbestos from these sources cannot be relied upon.

There are, altogether, fourteen companies incorporated, of which ten are operating their mines and mills,



Rotary Dryer at the Johnson's Asbestos Co., Thetford

(special) \$75.00 to \$80.00; fibre No. 2 \$50.00; paper stock \$20.00 to \$25.00.

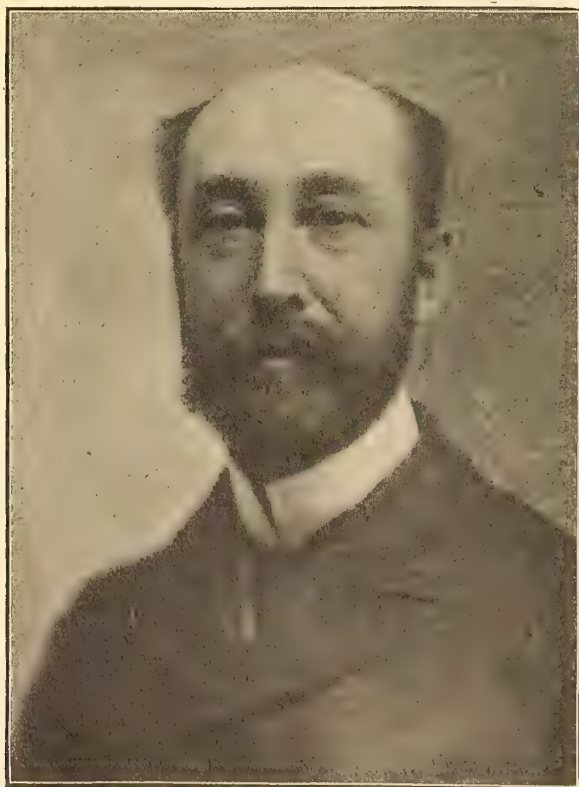
The status of the industry is summed up in the following paragraph:—

employing about 1,500 men. At present there is a shortage of good miners and, at the time the report was written, it was difficult to operate the mills and mines to their full capacity on this account.

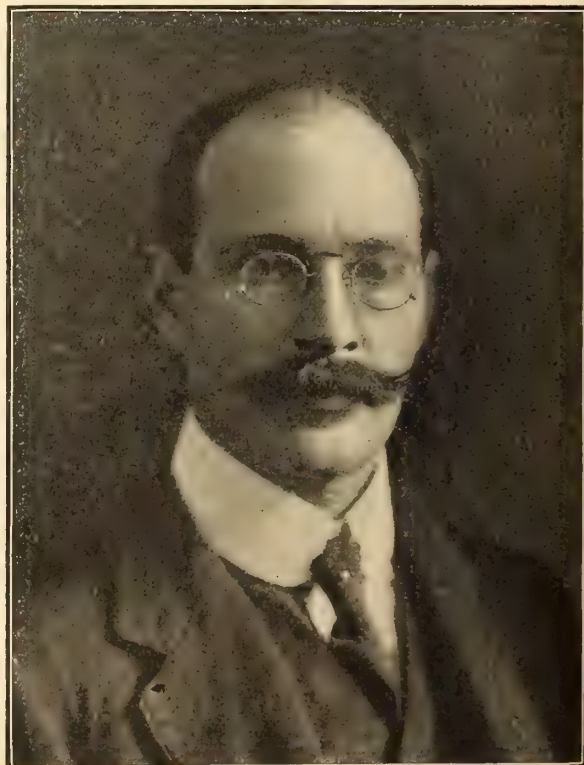
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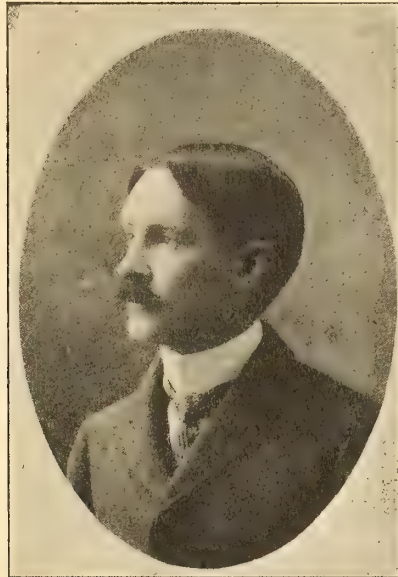


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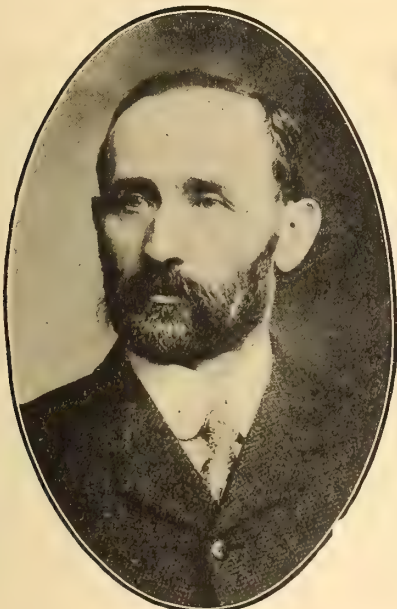
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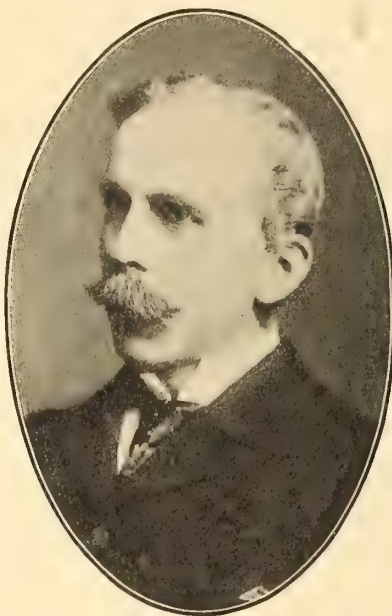
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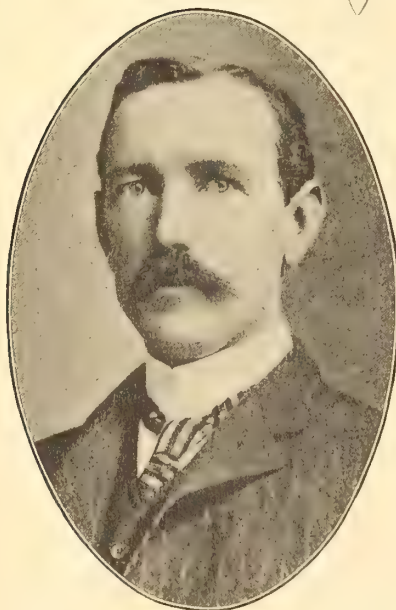


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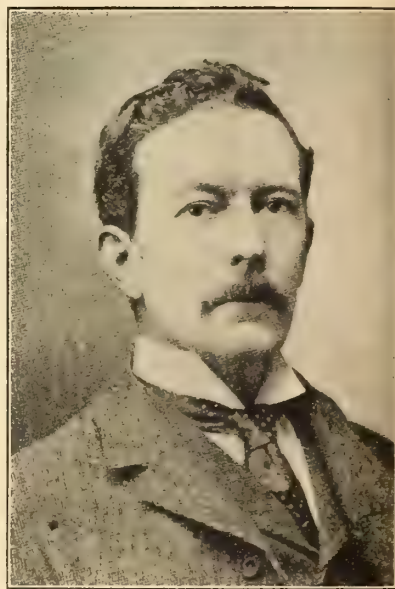
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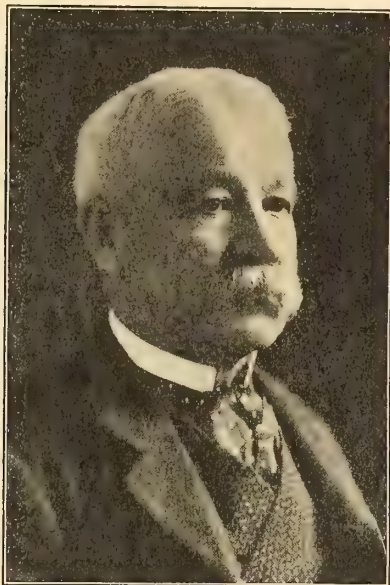


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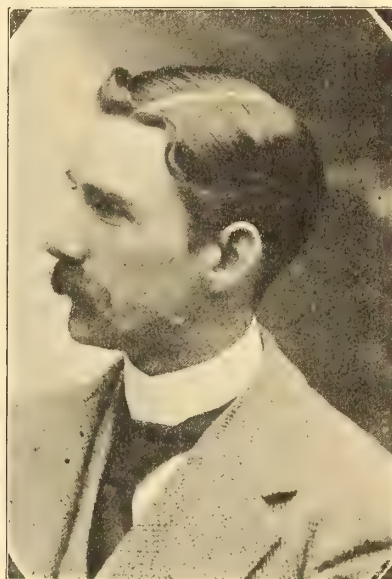
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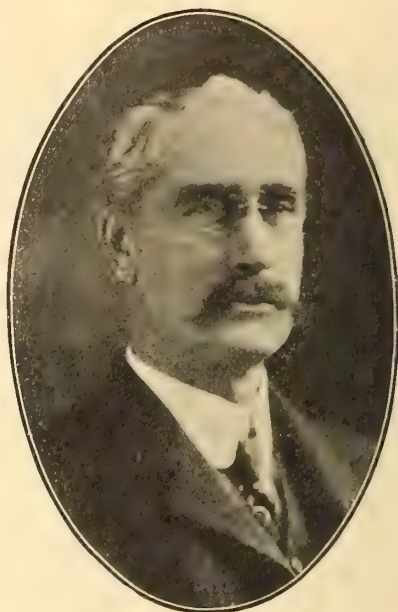


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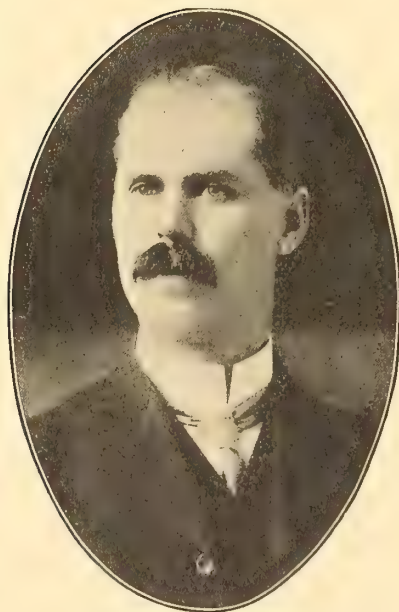
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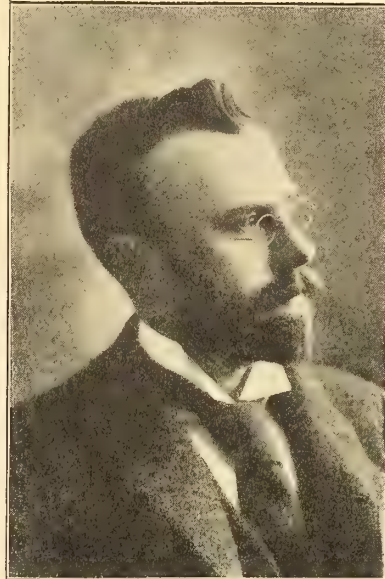
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Mr. J. OBALSKI, Inspector of Mines, Que-  
bec, Que.



## NOTES ON THE LIEGE EXHIBITION.

By Our Special Commissioner.

The City of Liege, in Belgium, population 160,000, is the centre of a considerable industrial and manufacturing district. It is surrounded by numerous coal mines and metallurgical works, including the celebrated John Cockerill Company, employing 12,000 men, the Vieille Montagne Zinc Company, and, in addition, many iron construction works, arms and automobile factories, etc. The Liege University has over 1,500 students, most of whom are engaged in the several branches of engineering study. This university receives many foreigners as undergraduates, while the Montefiore Institute, for the study of electricity, is another famous educational establishment in this city. Consequently, it may be easily understood that the people of Liege take an especial interest in industrial matters, which also accounts for the fact that the recent exhibition was so loyally supported by them.

of cobalt-silver ores from Haileybury, the estimated value of which was \$6,000; corundum from the Craig mine, with also specimens of finished product; asbestos from Thetford, crude and manufactured material; amber mica from the Ottawa Valley and white mica from the St. Lawrence Valley; radium ore from Murray Bay; galena and copper gold ore from British Columbia; coal from Vancouver Island, Crow's Nest Pass and Alberta Districts; iron ores, coal and gold-bearing quartz from Nova Scotia, and last but not least a fine display of gold dust and nuggets from the alluvial fields of British Columbia and the Yukon.

No less complete and interesting was the display of building material, such as granites, limestones and sandstones, specimens of which were shown in the form of polished cubes. Then, too, there were piles of plumbago, apatite, talc and feldspar, while such minerals as manganese, gypsum, baryte, etc. were shown together with a very large collection of hand specimens from mines in every section of Canada were shown under glass cases. Visitors to the ex-

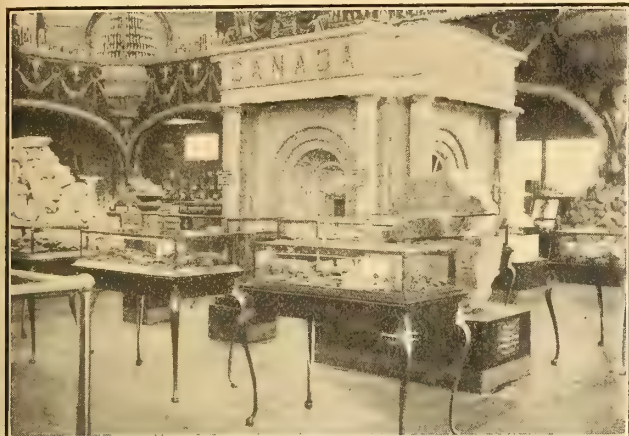


THE DISPLAY OF CANADIAN MINERALS.—On the left, exhibit of B.C. silver-lead ores; on the right Haileybury cobalt, silver and nickel. In the rear Exhibit of Sudbury nickel and copper. Mr. W. D. Dalglish, of the Canadian Exhibition staff is shown standing at one of the cases.

The Canadian display of minerals, in particular, attracted great attraction, and it is said that of the 6,000,000 people who visited the exhibition quite a considerable proportion thereof passed through the Canadian pavilion. The arrangement of the mineral section was very carefully planned and successfully carried out, with a view chiefly to emphasizing the industrial and commercial potentialities of the Dominion. The minerals and ores were distributed in the hall in large heaps, and prominently labelled with reference to production values, etc. Among the most important displays were Sudbury nickel ores, nickel matte and specimens of refined nickel; a pile

hibition were presented with a complete catalogue printed in French and English, and also with the official reports of the Mining Departments of the respective provinces, while of course the commissioners in attendance were kept very busily engaged replying to enquiries and giving special information to the public. It is believed, in consequence of the information thus supplied that the European markets for Canadian corundum, mica, asbestos, zinc and lead ores in particular, may be extended. During the period in which the exhibition was opened several important international meetings of men representing mining, metallurgical, geological and other sciences





Vault containing gold from Yukon and B.C.  
The large pyramid on the left is composed of ore from Haileybury.



The display of Graphite, Mica and Corundum.

were held at Liege, but it is very much to be deplored that Canada was not officially represented at any of these meetings. The "Congrès International des Mines Métallurgie, Mécanique et Géologie appliquée" was in particular a notable success, no less than 1,200 people, including many eminent engineers from all sections of the globe being in attendance. The pro-

ceedings and discussions were for the most part in French.

While at the Liege exhibition other countries made good displays of machinery, mine products, etc., it was generally conceded that the Canadian exhibit was the most complete and the most representative, and this is a matter for sincere congratulation.



In this section was shown a fine exhibit of Sudbury Nickel, Building Stone, a large block of Asbestos from Black Lake, Que., and a column of Jasper Conglomerates from Bruce Mines, Ont.

#### NOTES ON THE CROW'S NEST COAL FIELD, BRITISH COLUMBIA.\*

By James Ashworth.

**Crow's Nest Coal-field.**—The Crow's Nest coal-field is situated immediately west of the summit of the Rocky Mountains, about 370 miles from the Pacific coast, and practically the whole of it lies in British

Columbia. The coal-field is of Cretaceous age, and the rocks of this section cover an area of about 500 square miles; but the coal-field has an area of only about 230 miles and is of leg-of-mutton shape, with a length from north to south of about 35 miles, and a width from east to west varying from 4 to about 11 miles. It is bounded on the west by the Elk river, which runs parallel to the upturned edges of the measures, and the outcrops of the coal are found commencing at an elevation of from 1,500 to 2,000 feet above the river, with a dip to the eastward of from 20 to 40

\*Extracts from a paper read before the Manchester Geological and Mining Society, February, 1905.



degrees. The coal-field is in the shape of a flat-bottomed basin, and the coal therefore crops out with its upturned edges to the north, south, east and west.

The coal-field is based on the Devono-Carboniferous limestone, and in ascending order, from this base, there are beds of dark shale and soft calcareous shales, known as the "Ferne shales," which have been much crushed and folded. The coal-seams above have not, however, been affected to the same extent, particularly on the west and south sides, and it has been assumed that the very hard beds of conglomerate (consisting of black and grey chert, embedded in a silicified matrix) and gritty sandstone (shown at the top of the section of the Morrissey coal-field, made by Mr. James McEvoy),<sup>†</sup> have resisted the eroding crushing and folding forces that are in evidence elsewhere.

The total thickness of the Cretaceous rocks in this coal-field has been estimated at from 12,000 to 13,000 feet and in the section before referred to, there is a thickness of about 198 feet of workable coal in a depth of 1,847 feet of strata. Seams of 3 feet and under are omitted from the calculation.

Samples of the seams of coal collected by the inspectors of mines gave the following percentage-analysis:—Moisture, 0.91; volatile combustible matter, 19.01; fixed carbon, 69.93; ash, 9.83; and sulphur, 0.32. The coke made from these coals is long, lustrous and strong, and is shipped to the smelters in Canada and the United States, *via* the Canadian Pacific and Great Northern railways.

At Coal Creek and Carbonado, the valleys are so narrow, where the mines are opened out, that the coke-ovens (bee-hive) are placed at some distance from the mines; but at Michel, they are close to the works.

A peculiar legislative restriction is placed on the Crow's Nest Pass Coal Company, by which they are prevented from charging more than 8s. 4d. (2 dollars) per ton for run-of-mine coal at the mines.

Most of the coal-seams are soft, and produce a large proportion of small slack.

The seams of coal, now being developed in several places, have not been absolutely correlated, but Mr. J. McEvoy places Nos. 61, 63 and 71 in his Morrissey section, as being the same as the three seams of coal at Coal Creek, which are respectively 10 feet, 30 feet and 6 feet thick. No. 61 seam will therefore correspond with the Fernie mine (Coal Creek, No. 2), in which the explosion occurred in 1902; and with No. 1 mine, Carbonado, where the huge outbursts of gas occurred.\* Although the thicknesses of the coal-seams are much the same at both places, the intervening strata have thinned to the north, thus, 140 feet and 197 feet, or a total of 337 feet, become 60 feet and 42 feet, or a total of 102 feet, showing a reduction of 235 feet. It would seem that this thinning process is continuous in a northerly direction, and in the Frank-Blairmore coal-field (adjoining the Crow's Nest coal-field on the north, and divided from it by the main range of the Rocky Mountains), the productive thickness of the Lower Cretaceous measures is placed by Mr. W. W. Leach at 740 feet, with 125 feet of coal, thus showing a great thinning of both coal and shale.

FRANK-BLAIRMORE COAL-FIELD.—The Crow's Nest and Frank-Blairmore coal-fields are practically one coal-field separated by great upheavals, foldings and crushings of the strata.

<sup>†</sup>"Summary Report on the Operations of the Geological Survey for the Year 1900, by Dr. G. M. Dawson, *Annual Report of the Geological Survey of Canada*, 1900, 1903, vol. xiii., section A, page 87; and *Ibid.*, 1901, 1904, vol. xiv., section A, Nos. 759 and 767, maps.

\**Trans. Inst. M. E.* 1905, vol. xxix., page 56.

From the "Loop," say, 3 miles east of Michel, the Devono-Carboniferous rocks forming the eastern boundary of the Crow's Nest Coal-field, are in evidence nearly as far as the eastern end of the Crow's Nest Lake, where there is a faulted contact with the Upper Cretaceous and Laramie measures. These measures continue for the next 4 miles, and are followed by beds of volcanic ash, agglomerates and Flathead shale beds, for 1½ miles, until the Lower Cretaceous coal-measures are again met with near Coleman. From Coleman to Frank the coal-field is very much disturbed, and at Frank the limestone is pushed right through the coal. At the western contact of these strata, there is a well-known sulphur spring, and at its eastern contact the coal-measures are turned up, and, in fact, partly turned over by the limestone upheaval. This vast intrusion of limestone on the north side of the railway is known as Bluff Mountain; on the south side as Turtle Mountain; and the space between, through which the railway passes, is known as the Gap. For about 4½ miles east of Frank, the coal-measures are disturbed and folded, and a fault forms the contact with the coal-seams and lignites of the Upper Cretaceous and Laramie measures. The Upper Cretaceous coal-seams have been opened up to only a very limited extent.

One of the most noticeable of the great disturbances and movements of enormous masses of limestone-rock in this district is clearly demonstrated by the position of the Crow's Nest Mountain, perched on the Upper Cretaceous measures, about 4½ miles north of the railway.

Other notable disturbances are common in the Alberta district of Canada, and an instance, near Banff, may be interesting, as the coal-measures there are based on the limestone and also covered with limestone, and the coal-seams are both bituminous and anthracitic.

FRANK.—At Frank, the coal-measures, as previously noted, have been cut through and tilted by the limestone forming Bluff and Turtle Mountains. An adit-level has been driven into the coal near the foot of Turtle Mountain, by the Canadian American Coal Company, Limited, to a coal seam from 12 to 16 feet thick.

Referring to the rock slide which occurred about 4 a.m. on April 29th, 1903, it is stated that the precise height of the mountain above the valley does not seem to have been known, but it was probably about 2,500 feet. There were no premonitory symptoms of a fall, and work was proceeding as usual at the mine.

So far as the writer knows, it is still an open query as to what set 500,000,000 cubic yards of limestone rock in motion. Several theories have been propounded, one of which was that there had been an earthquake but there does not appear to be anything to support this suggestion, any more than that at Lille, 4 miles to the north, and at Blairmore, 2 miles to the west, people were awakened out of their sleep by the noise and shock of the falling mass. Another theory was that water, formed from melting snow, had found its way to the base of the mountain and had thus formed a slippery bed, over which loosened rock, pressed down by the superincumbent mass above, commenced to move, and thus brought about the fall. It was also suggested that a hard night's frost, following a warm opening day of spring, was the force which set the mass in motion. Many other theories have been suggested, but they are quite outside the possibilities of the occurrence. The writer thinks as the Cretaceous rocks had been weakened and broken by upheaval and exposure on both sides of the outcrop of the coal-seam, that the removal of the coal had the same effect



as taking out a sprag from underneath the foot of Turtle Mountain, and that the movement was thus originated. It may be observed, however, that the damage done within the mine was very slight, excepting near the entrance.

The adit-level has now been reopened, and a pit has been sunk near the Gap; and supposing that the working of the coal-seam from the adit-level was the disturbing cause of the disaster, it appears possible, if not probable, that at some future date the disaster may be repeated, and the whole of the remaining portion of the town of Frank might be swept away. The number of empty houses in the town is sufficient evidence to a stranger, that the miners of the district have not recovered sufficient confidence in the stability of the face of Turtle Mountain, to take up their residence beneath its shadow.

### CONCERNING MINING TITLES IN ONTARIO.

THE ARGUMENT OF J. M. CLARK, ESQ., K.C. AGAINST AN APPLICATION FOR A FIAT. JUDGMENT GIVEN FOR DEFENDANTS.

It is in the first place to be observed that this matter should be dealt with under the provisions of the Mines Act as it stood at the date of the lease to the applicant. This is important in view of the fact that the Inspector appears to have confused the position of a Lessee with that of a Licensee under the regulations governing Mining Divisions, for he reports as though he were dealing with a mining claim in a Mining Division and not with a lease under the Mines Act. The Mining Division at Cobalt was only set apart on the 5th of April, 1905 and when so set apart the claims in the Mining Division become subject to very wide and extensive powers of regulation by the Government. On the contrary the provisions of the Mines Act in regard to leases apply to the whole of the Province with the exception of the lands covered by Mining Divisions, that is at the time of this lease the whole of the Province of Ontario except the Michipicoten Mining Division.

It is next to be pointed out that in this case there is no question but that the application of the Applicant and the affidavits filed in the Department in support of his application before the lease was issued to him were bona fide and in all respects regular.

No case is made out for attacking the lease. It is suggested that it would not pay to work galena but such a test is not at all justified by the wording of the Act which requires the discovery of valuable ore or mineral. Galena is well known and recognized as a valuable ore or mineral and is in fact the usual ore of lead. In reference to this it is sufficient to point out that the reports of the Department of the Bureau of Mines have recognized galena from year to year as a valuable mineral. It is suggested by the Inspector that this galena would not pay to work unless accompanied by silver, but in the Bureau of Mines Report for 1899, Vol. VIII, p. 32, there is an account of a galena deposit which is referred to as quite promising. It is described as "galena associated with gangue of calcite. The galena is non-argentiferous or practically so." This report was distributed with the sanction of the Government and the Legislature.

Parties dealing with the Government were entitled to rely on this and on the interpretation of the Act adopted by the Crown Lands Department until long after the issue of this lease. Any new interpretation should not, it is submitted, be in any event invoked

to defeat vested rights bona fide acquired before such new interpretation was heard of.

The Complainant in this case has clearly no Status. He is a trespasser, a mere volunteer. At the time of the issue of the lease he had no interest whatever in the property so leased and for reasons ably pointed out by Chief Justice Robinson in *Bolton v. Jeffrey*, 1 E. & A 111, great inconvenience would arise if "when no fraud, misrepresentation or concealment is imputed to the Patentee" titles could be attacked. The Chief Justice in that case also points out that such an instrument as that now being attacked either in the shape of a lease or a grant in fee simple lies at the root of every man's title in this province. The above language was quoted with approval in *Henderson v. Westover*, 1. E & A 465 at page 483. In view of the great experience and learning of the eminent and able Judges whose decisions are above referred to it is respectfully submitted that their views which hitherto have never been questioned should be acted on in the present case by refusing to attack the said lease.

The case against interference is greatly strengthened by the fact that in the letter of the Applicant to the Crown Lands Department of December 10th, 1904, he said "Kindly let me know if there is anything else necessary to be done in connection with the taking up of the above lot at the present time and greatly oblige." Subsequently and with this letter before them and also the fact that the affidavit showed a discovery of "galena" the whole matter was investigated by the Department and a formal report made by the proper officer dated the 3rd of January, 1905, and the formal ruling granted for the issue of the lease. The Crown accepted the first year's rental at that time and subsequently the second's year rental, and where as in the present case no imposition on the Government is suggested much less proved it is submitted that the lease should not be questioned by the Crown.

It is to be observed that the Mines Act does not require ore or minerals to be found in place although this is or may be required by the Regulations applicable to Mining Divisions. All that is required is that there should be an affidavit showing the discovery of valuable ore or mineral on the property applied for.

The construction sought to be placed upon the Act in the present case was discussed by a very able and experienced Federal Court of the United States in *Book v. Justice Mining Company*, 17 Morrison 617, where as in the present case it was sought to show that to constitute a discovery ore which would pay to work must be shown. The Court therein giving judgment at page 644 said "If this view should be sustained it is manifest that it would lead to absurd, injurious and unjust results destructive of the rights of prospectors and miners" etc.

It is well known that at the surface of the Anthracite Mines of Pennsylvania the coal is so mixed with country rock that it would not pay to ship and if the view contended for in the present case, therefore, were to prevail the person making such a discovery would not be protected because they would have to sink several hundred feet before mineral which will pay to ship is obtained. The same thing applies to many probably most discoveries of iron ore. In fact if the view above referred to prevailed all the locations of the iron ore deposits on the celebrated Vermillion range in Minnesota would be invalid. This is specially referred to because the authorities of Ontario have for several years been holding out that in Ontario there are formations similar to those on the Vermillion



range. If a prospector or explorer finds such ore it is submitted that he has made a discovery of valuable ore or mineral and the fact that at the surface the iron ore is so intermixed with country rock that it would not pay to ship would not invalidate the discovery.

Strong hopes have been officially held out by Ontario that a copper mining industry might be developed in this Province and the importance of such an industry can hardly be exaggerated. It is well known that it takes hundreds of thousands of dollars to find out whether a copper property will pay to work or not. One practical man said it takes at least two million dollars to make a copper mine. If, therefore, a lease such as the present is open to attack on the grounds suggested it would obviously be quite impossible to commence copper mining in the Province.

Reference is also made to the judgment of Mr. Justice Street in *Ontario Natural Gas Company v. Smart* 19 *Ontario Reports* at 591 where after discussing the decisions he says "I think myself bound by the authorities to give to the word (mineral) when used in this Act its widest signification." This judgment where natural gas was held to be a mineral was confirmed by the Court of Appeal 18 *Appeal Reports* (1891) 626. It is submitted that this rule of construction so enunciated by our Courts should be followed in the present case and the application for a fiat dismissed.

The general principle is also referred to that in order to set aside a title such as the present where it is under the Great Seal of the Province testimony to impeach it must be clear, unequivocal and convincing of which class of testimony there is in the present case no trace whatever. No evidence is adduced even tending to prove that this lease was issued "erroneously or by mistake or improvidently or through fraud."

It is specially submitted that persons dealing with the lessee should be protected. The Crown having granted this lease and it being clear that to use the language of Chief Justice Robinson "no fraud misrepresentation or concealment" can be imputed to the lessee it is submitted that the Crown should do nothing to derogate from or destroy its own grant. On the contrary it is submitted that the prerogatives of the Crown should be exercised for the protection of the rights of the lessee and those bona fide claiming under him.

It has been well said that the highest security a British subject can have is the honor of the Crown which as the maxim runs can do no wrong.

This security the Defendant and those dealing with him had in the most solemn form under the Great Seal of the Province of Ontario.

If such a title as the present is open to attack it would be a serious blow to the credit of the Province. It would render prospecting and exploration so hazardous and uncertain as to paralyse the Mining Industry of the Province.

All of which is respectfully submitted.

#### THE AMENDMENT OF THE ONTARIO MINES ACT.

To The Editor:

Sir,—Of the matters which will come under consideration at the Mining Convention to be held in Toronto on 12th December, the view point of some delegates will be that an open door should be given for the most extensive acquisition of mineral territory by capitalists and prospectors. Large territories heretofore granted to companies and private indi-

viduals have not returned, nor are they likely to yield, dividends. Tracts, really vast, were sold in Algoma and Thunder Bay Districts many years ago which came into the market again under Tax Sales, and are liable under recent legislation to be forfeited to the Government for large accumulations of taxes. Over some of these tracts much superficial prospecting has been done, with no result in the development of any large mine. Much information has been acquired showing that the first purchase of the land was wholly unwarranted; that a large amount of capital has been diverted into profitless expenditures, and that the interests of mining enterprise have suffered in consequence. No argument is needed to sustain the proposition that it is the duty of the Government as trustee of the public lands to arrest by all means in its power the reckless purchase of mineral territory by corporations and individuals for the mere purpose of speculation. Otherwise, morally speaking, the Government might as well enter into lottery enterprise. Every dollar expended in mineral property which does not bring profit to the investors through the employment of labor, is so much withdrawn from the fund available for sustaining the industries of the Province.

For consideration of the Convention I offer the following subjects wherein the Mines Act may be amended for the public benefit:—

1st.—It is admitted that it is debatable whether the grant of free miners' licences shall be subject in Ontario to the restrictions which apply to the grant of mining lands in the United States. Under United States' law mineral lands of the Federal Government are open to "occupation and purchase by citizens of the United States and those who have declared their intention to become such." Corporations entitled to acquire Federal (U.S.) lands must be such as are incorporated within the Union. In Ontario foreign corporations must obtain a license to acquire mineral lands. Having regard to the preservation of the forest, a register should be kept of all persons engaged in prospecting, and with this view the restriction of the grant of mineral licences to citizens by birth or naturalization will be a safeguard. Individual capitalists and corporations may easily circumvent the restriction of their operations to limited areas by employing parties of licensed prospectors. The Mines Act should be amended to require from every free miner a declaration whether he is an employed miner or working on his behalf. Where discovery is made by an applicant for a mineral claim the affidavit of the applicant should show whether the application is made independently or in trust for another, and if so for whom. The contention appears well founded that the applicant should not be required to produce the testimony of two persons as to their ignorance of any prior discovery. The investment of company capital will not be at all affected by the suggested amendment, inasmuch as a United States incorporated company may acquire land, having first obtained a license. There should, however, be a provision similar to that of New York State law, that every foreign mining company operating in Ontario should have at least one British subject on its Directorate. The Ontario Companies Act makes Directors liable for wages, but this protection is a barren one where employers consist of a foreign corporation whose directors are all resident citizens of a foreign country.

2nd.—The regulations of the Mines Act now applying to the Michipicoten and Rainy River Divisions should be extended to all the free grant townships with necessary limitations for the protection of land occupied for



farming purposes and especially land under timber. The clauses for the latter purpose cannot be too strictly framed. The preservation of the forests is as important to the mining as to any other industry in Ontario. The operations of prospectors should not be extended beyond the surveyed districts of the Province. There is ample area available for all the enterprise that may be attracted hither. The energies of ambitious adventurers may well be restrained within such limits as will ensure practical benefit to the settled portion of the community bearing the burden of taxes, the extension of transportation facilities and municipal administration. The large surveyed mineral areas outside of municipal boundaries in the Districts of Algoma, Nipissing, Thunder Bay and Rainy Rivers are of very little value to the Province. There the mining interest maintains no municipal system for the protection of private interests, no resident magistrates or constables for the protection of the forests. Mineral areas have been plundered of timber to a large extent. And all through the greed of individuals to acquire for speculative purposes large areas which they were financially or otherwise unable to develop.

3rd.—Royalties on other ores than those of gold and silver do not appear in the present state of mining development to be at all justifiable, and on gold and silver only to be commendable when the mines are productive of profit. There might be a sliding scale of royalty on large dividend-earning producers where the output as in the case of some Michigan and Wisconsin iron mines extends to many thousands of tons per year. The profitable exploitation of ores of zinc, lead and copper has not yet been attained in Ontario, and until the problems of reasonable transportation cost and cheap smelting have been solved the struggling industry of mining these ores at a profit should be allowed every possible advantage. It is however, beyond question that no royalty should be based on gross returns, but solely on the profit from mining operations. This proposition has recently been discussed in Cornwall, England, where it has been shown that a royalty of  $5\frac{1}{4}\%$  on tin ore was equal to 50% of the profits earned by the Dolcoath Mine.

4th.—Objection has rightly been taken to the power of the Inspectors of mining divisions to disallow applications where in their judgment there has been no valuable discovery of ore. While there should be free and unrestricted license to carry on mining operations for proving or disproving an alleged discovery, the grant may well be limited to short periods and subject to the pursuit of actual mining operations. Equality of rights of citizenship demands that the public domain shall not be thrown open to unrestricted blanketing operations by large corporations and plutocratic individuals. The pursuit, however, of alleged discoveries may well be allowed to those who stake their faith in their ability to follow a lead or a prospect shown by actual labor. A period of three months cessation of work might be allowed to enable a discoverer to get assistance to carry on his work, but this should be guarded by declarations of individual ownership, and the right might be made assignable on the expenditure of \$100 in labor on the property.

5th.—The registry law both in the mining divisions and in the County registries should provide for the full registration of every document affecting title. At present no grantee or lessee is under any obligation to register his grant or lease. Before issuing the document the Department of Mines may easily require the registration of the instrument and collect the fee therefor. Blank books could be supplied to registry offices to effect this object.

6th.—Large powers should be taken by the Mines Department for carrying on metallurgical operations in mining districts. No better mode of stimulating metallurgical discovery can be employed than the engagement of experts in experimental work in the reduction and smelting of ores, giving the public the benefit of their researches, and affording opportunity for the scientific investigation of the difficulties that present themselves in every mining region in the reduction and smelting of minerals. Efforts put forth to levy tribute on the mining industry of the country by means of the control of smelters and smelting processes may be met in the mode recommended, and with lasting benefit to the community.

New South Wales has entered into a contract with an iron master for the erection of a furnace and iron mill to be operated with native coal and ores. Here the large Dominion bounty of \$2 a ton on iron made from foreign ores has not been favorable to the development of Ontario iron mines. The foreign furnace managers regard the hematites they have been trained to use with greater favor than native magnetites for the use of which their furnaces would earn a bounty of \$3 a ton. And yet Sweden leads the world in the quality of its iron made from roasted magnetite ores similar to those of Ontario. The recent experiments with the electric furnace may divert attention from the ancient manufacture of the best pig iron with charcoal fuel. It will be some time, however, before the public will derive any material benefit from the electric method which seems destined to be of more value for the manufacture of refined ore and steel than for making foundry iron. The iron ores and hardwood forests of New Ontario can be brought into vital relationship with the railway progress of to-day by the erection of a Swedish charcoal iron plant and the importation of Swedish workmen to manufacture car wheels and railway castings. Such an enterprise will do infinitely more to lay the foundation of permanent thriving settlements than the sale of extensive iron ranges to foreign syndicates and the export of millions of tons of ore from the iron treasures of the Province.

Let the Act be amended, however popular agitation may direct, there will remain discussion, litigation and unsettled ideas until once for all it is accepted that no title in fee should hereafter be granted for mineral property of the Province. All grants of mines of any nature should be conditional upon their exploitation and development. Of no other property can it be so clearly stated as of mineral ores that their value depends upon use and when no use occurs no value is found. The total value of the gold production of the world is ascertained to be slightly less than its cost. Silver costs much less to produce it than half a century ago was the case, and the result is a great diminution in value which is likely to grow in downward ratio with the development of the New Ontario silver mines unless the expansion of Japanese trade in the East shall increase the demand for silver currency preferred by Orientals. Even iron owes to demand for its use those remarkable fluctuations which are expressed in the phrase that "iron is either a king or a pauper." The State has now in its power to avail itself of the increment of value due to public use by requiring that this element shall not be affected by non-user; that is to say that miners shall not keep mines inactive, but that, making reasonable allowance for financial stringency such as may extend over a period of two years, every mining property shall revert to the State if suffered longer to remain unproductive. It has been advocated that existing mineral grants, whether mineral of



economic value has been granted or not, should be taxed for municipal purposes. The road to municipal "graft" on this line is easy, and familiarity with confiscation by means of taxation placed within municipal control is not good Socialism. Nothing, however, but good can come of requiring that all grants or leases hereafter shall be vital only so long as they are occupied and used. What a stimulus to activity this would be! What a hindrance to rash speculation! What a source of benefit to investors! What a hum would be heard throughout the mining districts! The miners would benefit by steady employment. Manufacturers of mining machinery would not have to send out drummers for orders. Instead of sending ores abroad for concentration and reduction the country would rapidly enter the world's market as a producer of metals, and this for the reason that a steady supply of ores would in the nature of things lead to the erection of reduction and smelting works which will never be the case so long as the supply of ores is as now precarious and uncertain.

J. B.

### "WHY THE MINERAL INDUSTRY IN ONTARIO HAS NOT MADE GREATER PROGRESS?"

A Mr. T. M. Kirkwood, writing to the *Toronto News*, asks the question "why the mineral industry in Ontario has not made greater progress?", and offers as an explanation, the difficulties placed in the way of the prospector in securing title to mineral areas. As an example he cites his own case.

So long ago as March, 1903, he applied for 160 acres of land on Mettagami River, and was told by the Department that this section of the Province was not open for sale or exploration for mining, and that his application therefore could not be entertained. Later in the year he applied again to the Department, and received the same reply. In September of 1905, another application was made for this land, which had been located as an iron property, and was informed by the Department that his application be made to cover land, on which it had been reported there is a deposit of lignite, and that he had filed no affidavit of discovery in respect to the iron deposits. Mr. Kirkwood adds that he was fully prepared to have this property surveyed and to make affidavits of discovery directly he had the assurance of the Department that his application would be favourably received, and he concludes his letter by stating his belief, in which many will be found to agree, that all mineral areas in Ontario should be open to the prospector, for unless proper encouragement is given to the prospector, there can, of course, be no mining development.

### THE LE ROI AMALGAMATION.

We learn that two of the Canadian Companies proposed to become amalgamated with the Le Roi Company have sanctioned the scheme, and in consequence the Le Roi meeting will be held in the early future. Meanwhile the secretary of the latter company has issued a memorandum to shareholders replying to Mr. McMillan's circular of 31st October, in which it appears to us the arguments of that gentleman are very effectually disposed of. The circular states that the Board regret that they have not been able to call a General Meeting of the Shareholders in Le Roi Mining Company as soon as they expected, in consequence of unforeseen delays in regard, especially, to the holding of the meetings in Canada of the other Companies interested. They have however learnt by cable that Mr. Mackenzie, having, on behalf of this Company, inspected the properties proposed to be amalgamated, mailed his report on the 20th October, and that the meetings of the Canadian Companies will probably be held on or before the 14th Novem-

ber. On receipt of Mr. Mackenzie's report, and on learning the results of the meetings of the other Companies interested, they will at once take steps to issue their report and call a General Meeting of the Le Roi Shareholders. The properties referred to by Mr. McMillan, examined between October, 1904, and January, 1905, are not all the same as those now proposed to form a new combination, and further examination was therefore required.

Mr. McMillan states in his present Circular that he has obtained in the United States Courts an injunction to prevent the removal of valuable machinery from the Northport Smelter until a meeting of Shareholders can be held. If so, this was a most unnecessary proceeding, inasmuch as there has never been any intention of doing more than "cleaning up" with a view to recover from the surroundings of the smelter the values which are deposited there as the result of smelting operations.

Mr. McMillan states on the question of a dividend, "I do not see any difficulty about the matter at all, unless the available funds have been used for other purposes since I left the Board," which he did at the end of August. It is only right to say, therefore, that the available cash balance at that time was £1,309 in London. There was then owing to the Bank on account of advances, demand notes, and interest, £27,775. As stated, therefore, previously by the Board, a dividend could only have been paid by further borrowings from the Bank on Matte in transit.

As regards the matters referred to by Mr. McMillan, the Board cannot do better than forward for the information of the Shareholders the following extracts from letters which they have recently received from Mr. Mackenzie. These show plainly how unfortunate for the Company has been Mr. McMillan's recent administration of its affairs, how little to be depended upon are his statements in regard to his officials, and how small a chance there would be of any profit for the Shareholders if its management were again confided to him.

September 22nd, 1905.

"There is one subject I wish to call your attention to . . . and that is the Ore Reserves in the Le Roi. "Since I first saw the Mine they have never been as low as at present, and if amalgamation does not materialize, your Company will have a tremendous amount of development work to do this coming year . . . It is a fact that "not sufficient development work has been done in the last year to keep up the Ore Reserves."

September 30th, 1905.

"As the matter now stands the Contract with Trail "would have saved your Company \$109,579.47 if Northport "had been shut down a year ago."

October 4th, 1905.

"When I have completed the St. Eugene and Trail Smelter "examination will be time enough to relieve Mr. Astley, "although he is not feeling well, and is anxious to reach a "warmer climate. Regarding Trevorrow, I believe he has "worked hard and faithfully for your Company; in fact he "has done everything underground without help or advice."

October 19th, 1905.

"On talking to Mr. Trevorrow to-day concerning his "connection with amalgamation, I was very much surprised "to find that Mr. Astley was absent and sick in Spokane at "the time Mr. Trevorrow made an examination of the War "Eagle and Centre Star. Mr. Trevorrow states positively, "and will write me a letter to that effect, that he was never "consulted about amalgamation in any way whatever, was "not asked, and never gave an opinion to Mr. McMillan or "Astley about amalgamation."

As regards the Concentration Mill which has been erected by Mr. McMillan during the past year and upon which the estimated expenditure has been largely exceeded Mr. Mackenzie writes under date October 19th, 1905:—

"I have shut down the experimental concentrating plant, "as it is not adapted for the work required. As a matter of "fact it is not a copper concentrator but a copy of a lead con- "centrator plant located in Idaho. There are two leading "factors to be considered in the successful concentration of "copper ores by water. The first is proper classification, "and the second, that the pulp should be of the proper con- "sistency when it reaches the tables. If you will look at our "report on the concentration of Le Roi ores dated September "5th, 1904, you will note that Bradley and Mackenzie recom- "mended that great care should be taken in selecting a suit- "able system of classifying and settling tanks, and stated as "our belief that the Sherman system would be the most "suitable. No attention has been paid to this warning, and "the plant has been built without a proper system of class- "ification. So much water is added to the pulp in the different "stages of crushing, jigging, elevating, etc., that when the "pulp reaches the concentrating tables it is not in proper "condition to treat successfully. No provision has been made "for thickening this pulp, and the result is the values are "washed away by an excess of water."



"You will also remember that Bradley and Mackenzie recommended using the present Le Roi picking tables, crusher plant, aerial tramway, ore bins, etc. This advice has not been followed and ore that should be hand sorted and go direct to smelter is allowed to pass into the concentrator causing an excess of slimes which are lost in the tailings. Instead of taking advantage of the ample appliances of the Le Roi plant for handling the ores, the concentrator was placed on an almost level site that compels the use of expensive elevators and the costly method of tramping all the concentrating ore through the Black Bear tunnel.

"Mr. Thomas Mitchell, who designed and built the plant, was brought here by Bradley and Mackenzie as a millwright and not as an expert on copper concentration. In fact Mitchell has never had any previous experience in designing plants for the treatment of copper ores."

"After making my report in September, 1904, I especially cautioned your Managing Director, Mr. McMillan, against trusting to the advice of Mitchell because the latter gentleman knew nothing about the difficulties of concentrating Rossland ores. It is only necessary to point out Mitchell's estimate of this experimental mill and compare it with the actual cost in order to arrive at a true estimate of his ability and judgment; estimates were \$13,000.00 for a complete plant, while the actual cost has exceeded to date over \$30,000.00.

"In the face of Bradley and Mackenzie's advice Mr. McMillan chose to follow the lead of Mitchell, with the result that the experiments prove nothing, the money expended is practically wasted, while radical changes will have to be made in the plant before experimenting further."

Mr. McMillan's management has thus been unfortunate for the Le Roi Company in the following respects:—

1. A direct loss of \$109,579 in one year by continuing to use the Northport Smelter against the advice of Messrs. Bradley and Mackenzie.

2. Employing for twelve months a Superintendent physically unable satisfactorily to perform his duties.

3. Expending to date over \$30,000 in fruitlessly experimenting on water concentration without proper advice and in disregard of the warnings plainly given to him by Messrs. Bradley and Mackenzie.

4. Failing to maintain development whilst extracting profitable ores, the result of previous development, as testified by his own foreman, Trevorrow, who was practically the only expert under him able to superintend the workings, and who is not, as Mr. McMillan asserts, opposed to amalgamation.

The profit made by Mr. McMillan during the year—which it must be understood did not exist at the end of the year in the form of cash—was most unsatisfactory for the following and other reasons:—

1. The substitution of the Tacoma Contract in place of the New York Contract for the treatment of Matte yielded an advantage of about \$53,000.

2. The enhanced price of Copper gave an advantage of about \$34,000.

3. The decreased price of Coke gave an advantage of about \$11,000.

4. The fact that he has shipped the best ore available without maintaining the Ore Reserves or expending a sufficient amount on the necessary development of the Mine.

Compared with the facts and circumstances of the case the pretensions of Mr. McMillan as to his success in the management of the Le Roi Mine in the past as well as his representations as to its existing conditions, and the expectations which he endeavours to raise in its future prospects under his management without amalgamation, are not merely misleading but are simply ludicrous.

## SOME RECENT MINING AND METALLURGICAL PATENTS.

(Specially Reported for the MINING REVIEW.)

799,021—Ore-Concentrating Table. Alexis Tetrault, Denver Colo., assignor of one-half to Edwin C. Pohle, Denver, Colo.

In an ore concentrating table, a foundation-frame, a table having V-shaped bearings on its under side, pairs of pointed rock-arms engaging the grooves of said bearings, a pair of beams supporting said rock-arms, means for adjusting said beams at the feed end of the table, guide-brackets within which both ends of said beams are loosely placed, means on the beams engaging said brackets to prevent said rock-arms from sliding out of the table-bearings, and means for reciprocating said table.

798,843—Dry-Ore Concentrating Table. Alexis Tetrault and Edwin C. Pohle, Boulder, Colo.

In a dry concentrator, a quadrilateral smooth-surfaced table a cover therefore supported at a distance therefrom to form a chamber leaving openings across three edges of the table the openings at two of said edges being for the inlet and for the outlet of air-currents, the other for the discharge of the concentrates, a closure for the fourth edge of said table-chamber, a feed-hopper opening for the fourth edge of said table-chamber, a feed-hopper opening into the table-chamber on its closed side, means to draw air into, through and from said chamber between the feed-hopper and the delivery-opening and means for imparting reciprocating bumping movements to said table.

799,548—Process of extracting gold from its ores. Friedrich W. Dupre, Leopoldshall, Germany.

A process consisting in subjecting the ores to the dissolving action of aqueous solutions of cyanids in the presence of alcohols.

799,161—Gold Saving Machine. Jonas B. Holmes, Los Angeles, Cal., assignor to Holmes-Bowman Dry Placer Mining Co. a Corporation of Arizona.

In a placer gold-separator; a separator box pivotally supported in bearings; means to give said lateral reciprocatory movements and means to cause the alternate elevation and depression of the ends of said separator-box, each end being alternately higher than the other end.

799,743—Process of treating zinc ores. Philip A. MacKay, Wenona, Ill.

A process which consists in subjecting the ore to a dead roast, whereby the zinc sulfid is oxidized and the cadmium sulfid converted into cadmium sulfate, thereafter dissolving out this deleterious sulfate and then grinding and distilling the remaining zinc oxid to obtain therefrom the pure refined zinc.

799,745—Metallurgical Furnace. Philip A. MacKay, Newcastle, New South Wales, Australia.

A metallurgical furnace comprised in a unitary structure, the combination with parallel passages or chamber extending longitudinally along the center of the furnace, regenerative furnaces extending longitudinally along the sides of the furnace, passageways connecting the regenerative furnaces with the parallel chambers, partitions between the chambers, each partition being hollow to form a left and right reduction-chamber having thin walls, oxidizing-chambers extending longitudinally over the regenerative furnaces one at each side of the structure, passage-ways connecting the left reduction-chambers with the left oxidizing-chamber, passage-ways connecting the right reduction-chamber with the right oxidizing-chamber, an opening in the top of each reduction-chamber for receiving the products to be treated, a passage way below each row of reduction-chambers, and a trap-door at the bottom of each reduction-chamber by means of which the products of each of the reduction-chambers may be conveyed to each of the passage ways below the reduction-chambers.

799,862—Process of separating ferriferous zinc compounds. Guy L. Meaker, Evanston, Ill., assignor to The American Steel & Wire Company of New Jersey, a Corporation of New Jersey.

A process of separating ferriferous zinc compounds by rendering the iron component neutral to the electrolytic action the method of oxidizing the electrolytic solution which consists in giving the anode an active surface larger than that of the cathode.

800,370—Magnetic Separator. Charles M. Green, Lynn, Mass., assignor to General Electric Company, a Corporation of New York.

In a magnetic separator, a frame, a magnet mounted thereon comprising two similar interlocking core-bodies having pole-pieces formed thereon, a coil inclosed by said core-bodies, means for connecting the coil in circuit, a hopper for feeding material to the magnet, and a revolving brush for removing magnetic material from said magnet.

800,588—Roasting Furnace. August R. Meyer, Kansas City, Mo., assignor to The United Zinc and Chemical Company, Kansas City, Mo., a Corporation of New Jersey. A furnace having side and end walls of masonry and external buttresses, at the opposite sides connected by cross-beams, which arches extending from end to end and a plurality of hearths above each arch, other arches arranged below the hearth-arches to form intermediate flues, said flues connected in series, and a plurality of shafts and rabblers carried thereby to sweep over the different hearths.



- 800,378—Amalgamator. Henry L. Lichtner, San Francisco, Cal., assignor by direct mesne assignments, of one-third to William Priest and one-third to Henry Feige, San Francisco, Cal.  
The combination in an amalgamator of a circular amalgamator concaved surface, means for supplying pulp and water upon the central portion of said surface, and an air-blast apparatus having radial outlets capable of discharging jets directly upon said surface in a downwardly and outwardly direction whereby pulp is carried up the incline and the waste is delivered over the outer edge thereof.
- 800,148—Smelting or Melting Furnace. Arthur B. Griffen, Verona, N.J.  
A furnace comprising a tiltable body provided with two chambers arranged in horizontal line, one of said chambers constituting a preheating-chamber, and the other an augmenting-chamber, a vertical partition between the two chambers having an eccentric opening for establishing communication between the two chambers for the passage of flame or gases when the furnace-body is in its melting position and for establishing communication between the chambers for the passage of molten metal from the preheating-chamber to the augmenting-chamber and for closing off said communication when the furnace body is tilted for pouring.
- 800,857—Electric Furnace. Frederick A. Kjsellin, Saltsjobaden, Stockholm, Sweden.  
The combination of an annular furnace-chamber, an iron core, surrounded by it, an induction-coil, and double-walled metal-sheet jackets being adapted to be passed by a cooling medium and on their whole length being provided with at least one interruption of non-conducting material.
- 801,703—Coal Washing Apparatus. John Anderson, Peoria, Ill.  
The combination of a rotatable cylinder having open receiving and discharge ends and consisting of sections containing perforations increasing in size from the receiving to the discharge end of the cylinder, a perforated trough surrounding the lower parts of said cylinder and located only beneath said sections having the larger perforations, and conveying-chute leading from said trough.
- 801,600—Thomas S. Miller, South Orange, N.J.  
In a conveyer, in combination a trackway, a carriage therefore, a hoisting-cable, a yielding support for said cable upon the carriage, a movable brake to engage the trackway, and connections from the brake to the yielding support for the hoisting-cable normally holding the brake out of action whereby the brake is applied by the load.
- 801,349—Ore Separator. Lois J. Vandervoort, Guthrie, Okla.  
An ore separator, comprising a sluice-box provided with a flexible bottom having a plurality of transverse discharge-openings, closures for said openings, beaters arranged at intervals under said bottom, and means for operating said beaters.
- 801,947—Magnetic Separator. John P. Wetherill, South Bethlehem, Pa. and Henry A. J. Wilkens, New York, N.Y., assignor by mesne assignments, to Wetherill Separating Company, a Corporation of New Jersey.  
A magnetic separator for materials of low magnetic susceptibility, comprising a series of magnets having highly-concentrated magnetic fields, a series of feed-belts for the several magnets respectively said feed-belts discharging the one upon the other, a receiver for heads in proximity to the concentrated field of each magnet, and a cleaner belt running past the magnets in the same general direction as the feed-belts.
- 802,229—Conveyer. Ovid D. Moses, Chicago, Ill.  
In an apparatus, a main frame, adjustable legs secured to and supporting said frame, casters pivotally mounted in said legs, an endless conveyer mounted on said frame, and means for driving said conveyer.
- 802,012—Method of separating nickel and copper sulfids. Ambrose Monell, New York, N.Y.  
A method which consists in adding to a matte containing such sulfids, a material which is solvent for some of the sulfids therein, heating the mixture to the point of fusion of said solvent, maintaining the mass in fusion until substantially all of the soluble sulfids have been dissolved, and allowing the undissolved sulfid to settle and separating it from the dissolved sulfid or sulfids.
- 802,242—Metallurgical Filter. Emma Stewart, Colorado City, Colo., administratrix of Charles Mannel, deceased.  
A filter, comprising a rotatable shell, longitudinal, spaced ledges within the shell, filter-plates secured upon the ledges, the shell beneath the filter-plates being perforated, and decanting-pipes having heads with which said perforations communicate in series.
- 802,779—Centrifugal Ore-Separator. Wilbur H. Peck, Chicago, Ill., assignor by mesne assignments, to Title Owners Company, a Corporation of Maine.  
The combination of a rotatable treatment vessel having a separating surface therein, an expansible and contractible deflector within the vessel having sections provided with channels adapted to receive retaining devices and a removable flexible covering around said deflector, having retaining devices with one of their parts embedded in the covering and another of their parts removably engaging said channels.
- 802,374—Actuating mechanism for ore-concentrators. Emil Deister, Fort Wayne, Ind.  
An actuating mechanism for concentrating-tables and similar devices, a table suitably mounted to be vibrated; a bracket fixed to said table; a block adjustably seated against said bracket; bolts having loose connections with said block and rigidly fixed in said bracket; springs in connection with the respective bolts and acting against said block towards said bracket; a reciprocating driving rod having a sliding connection with said block; a buffer having actuating connection between said driving-rod and block; and a spring in connection with said driving-rod and acting against said bracket.
- 802,724—Centrifugal Concentrator. Phineas H. Adams, Chicago, Ill., assignor by mesne assignments, to Title Owners Company, a Corporation of Maine.  
The combination of a rotatable treatment vessel having a separating surface therein, a core therein forming a covered separating channel or passage for the flow of material over said surface; means for employment of water whereby material can be removed from a desired portion of such surface around near its discharge end, and means in part rotatable with said vessel, for preventing water from flowing up into said channel beyond a predetermined distance during said removal.
- 803,156—Coal Screen. Henry Duggan, Toluca, Ill.  
A coal screen consisting of a single piece of sheet metal, a plurality of parallel steps formed therein, flat surfaces being provided between said steps, said flat surfaces having elongated transverse openings formed therein of less strength than said surfaces, whereby a flat surface is provided upon the upper end and the two sides of each of said openings, said openings terminating at the bottom of said steps.
- 803,472—Extraction and purification of zinc. Alfred V. Cunningham, Worthington, England.  
A process of obtaining a zinc salt from ores containing zinc which consists in stirring them with a solution of a zinc salt together with the acid which forms that salt the solution being kept about neutral and finally separating the solution from the spent residue.
- 803,278—Artificial fuel and process for making. Andrew Engle, Metz, Iowa.  
A process for making artificial fuel, placing unslaked lime into night-soil and offensive combustible matter to absorb the moisture and destroy the odor and when the lime is slaked thoroughly mixing the hydrate produced by the lime with the matter deodorized by the lime, then adding about double the quantity of comminuted dry fuel to the product as set forth; then adding about two gallons of oleaginous inflammable matter, tar or the like, to about ten barrels of the product and thoroughly mixing it therewith to make it adhesive and plastic.
- 803,402—Conveyer. Thomas Cox, Portland, Oreg.  
The combination of a conveyer-frame-work of a conveyer-belt carried by said framework, fins projecting laterally from said belts in different longitudinal planes thereof, and supporting means arranged beneath said belt and positioned for contacting only with the edges and the intermediate portion of the return lap thereof and permitting the passage therebetween of said fins.

## PLATINUM IN BRITISH COLUMBIA.

The *Inland Sentinel*, published at Kamloops, reports that during a recent clean-up at the Yale Hydraulic Mining Company's claim, at Yale, the black sand was found to contain platinum to the value of \$2.00 to the ton of sand. The clean-up, representing one week's work of ground sluicing, is said to have yielded 109 oz. of gold, while 600 lbs. of black sand was saved containing the platinum in question.



## RECENT PUBLICATIONS.

Part II of the Report of the Ontario Bureau of Mines for 1905, has been issued, and contains the most complete report yet published of the Silver-Cobalt-Nickel ores of the Temiskaming Mining Division of Ontario. Much of the material contained in the report has been previously printed in the Bureau's reports for 1904 and 1903, but the present pamphlet revises and corrects some data of the previous prints, and supplements them by a concise sketch of the foreign sources of Cobalt ore. Some few pages, five or six, contain a brief account of the Keewatin ore deposits, closely associated with these unique silver ores of the Lower Huronian, and there is no doubt but that this Part II will be very largely called for by investigators and investors as affording, in small compass, a synopsis of all that is known concerning Silver-Cobalt-Nickel ores at the present time. There is no mention of the metalurgy of these ores in this report.

The British Columbia Government is now taking active steps to advertise the mineral resources of that province, and the Bureau of Mines recently issued two bulletins, one of which, by the provincial mineralogist on the Windy Arm district, is referred to elsewhere. Bulletin No. 2, just issued, is a report by the provincial assayer Mr. H. Carmichael, on the Big Bend district, a section of British Columbia north of the Canadian Pacific Railway, enclosed by the Big Bend and Columbia Rivers, and having an area of, approximately, 2,300 square miles. This district was first visited by miners in 1865, when extensive placer operations were carried on. Since then it has been explored as well for lode deposits, and a number of promising locations have been made. The district however has suffered from the lack of adequate transportation facilities. The most important development properties are the J. & L. group and the Standard group, and the Keystone.

## NOVA SCOTIA MINING SOCIETY'S SEMI-ANNUAL MEETING.

The Mining Society of Nova Scotia held a very successful semi-annual meeting on Nov. 29th, the morning session convening at the Halifax Hotel, while the afternoon session took place at the Board of Trade rooms in that city. Among those present were the following gentlemen: Messrs. A. A. Hayward, President, H. Wyld, Secretary, G. W. Stuart, Charles Starr, B. F. Pearson, M.P.P., F. Ronnan, J. W. Austen, Hugh Fletcher, E. R. Faribault, Dr. Poole, Chas. Archibald, Prof. Woodman, M. Daru, of India; R. H. Brown, Prof. Sexton, H. Piers, Burritt, D. McDonald, J. A. Johnson, and others. The President, Mr. A. A. Hayward, occupied the chair. The following new members were elected: C. S. McLean, Assistant Manager of the Beaver Hat Mining Company, J. Owen James, W. H. Sterns, W. Cecil Parsons, Sydney E. Thomson, Alex. Stephen, J. J. Stewart and W. C. Milner.

The committee appointed to co-operate with the Provincial Government in securing the services of a gold mining expert to report on the gold fields of Nova Scotia, presented their report, and Mr. E. R. Faribault, who had accompanied Mr. T. A. Rickard on his tour of inspection, gave an interesting account of the itinerary. He stated that they had visited nearly all the important mining districts, including Montague, Waverley, Caribou, Renfrew, Mt. Uniacke, Dufferin and others. A vote of thanks was accorded Mr. E. R. Faribault for the excellent work he had done as a member of the Geological Survey for the mining industry of Nova Scotia. Interesting papers were read by Prof. Woodman, of Dalhousie University, on "The Iron Ore Situation of Nova Scotia"; by Prof. Leischman, "Contrasting Coal Mining Methods in England and in the Province"; by Mr. R. H. Brown, on the "Record of Bore Hole No. 1, Standard Coal & Railway Company," and by Mr. J. Owen James, on "Mining Investment." We propose in a future issue to publish these papers either *in extenso*, or abstracts thereof.

A resolution was passed empowering the Society to grant a scholarship of \$50.00 each year to a student in mining engineering at Dalhousie College most distinguishing himself in his third year course.

The matter of encouraging the development of the iron resources of the Province created a considerable discussion, and the following resolution moved by Ald. J. A. Johnson, seconded by Mr. George W. Stuart, was passed:

Whereas, this Society has been pleased to note from time to time the gratifying development in the manufacture of iron and steel in this Province and attribute the inauguration and success thereof largely to the very generous and liberal manner in which the same was encouraged by the tariff of Canada;

And whereas, this Society is of the opinion that the Government should at an early date take into consideration the renewal on a modified basis, adapted to its present requirements of the bonuses and protection hitherto enjoyed by that industry;

And whereas, notwithstanding the said encouragement this Society views with alarm the fact that our iron industries, built up by Canadian capital and Canadian bounties are entirely dependent upon an outside ore supply, and regrets that the development of iron mining in the Province of Nova Scotia has not proceeded *pari passu* with the development of the iron manufacturing industry;

Be it Therefore Resolved:

That this Society is of the opinion that in any future re-arrangement of the tariff with reference to protection of aid to arrangement of the tariff with reference to protection or aid granted to such industry, a proportionate share of such benefits should be apportioned in such manner as would stimulate and encourage the development of our home mines.

A committee composed of the following gentlemen was then appointed to seek the co-operation of the Provincial Government along the lines proposed: Dr. H. S. Poole, Professor Woodman and Messrs. J. H. Austen, B. F. Pearson and J. A. Johnston.

Dr. Robt. Bell, Acting Director of the Geological Survey, and Dr. Martin, formerly Provincial Engineer, were elected honorary members of the Society.

In the evening the members and several invited guests sat down to a very enjoyable banquet at the Halifax Hotel, covers being laid for forty-two. The menu was as follows:—

|         |                                      |                    |
|---------|--------------------------------------|--------------------|
|         | Oysters on the Half Shell.           |                    |
| Celery. | —                                    | Olives.            |
|         | Mock Turtle aux Quenelles.           |                    |
|         | Baked Chicken Halibut à la Stanley.  |                    |
|         | Potatoes à l'Anglaise.               |                    |
|         | Roast Young Turkey, Cranberry Sauce. |                    |
|         | Mashed Potatoes.                     | Green Peas.        |
|         | Roman Punch.                         |                    |
|         | Broiled Moose Steak with Jelly.      |                    |
|         | English Plum Pudding.                | Maraschino Creams. |
|         | Cheese.                              | Crackers.          |
|         | Frozen Pudding.                      |                    |
|         | Coffee.                              |                    |

Toasts to the King and President of the United States had been drunk with musical honours. The President proposed the toast of "Our Guests." This was responded to by Dr. Robt. Bell, the Hon. W. T. Pipes, Minister of Mines, Mr. N. D. Daru, an Indian geologist, and Mr. H. Mortimer Lamb, Secretary of the Canadian Mining Institute. Mr. Pipes, in expressing appreciation of the good work done by the Society in promoting the development and exploration of the mining area, stated that the Province owed much to the mining industry, from which it derived a very large proportion of its revenue, and the income from this source this year was greater than it had been last. He stated that the Government would be glad to act on the suggestion of the Society and appoint an expert to investigate the iron occurrences of the Province, and assured them that the Government of which he was a member would be always ready to hear suggestions from the Society, and to act, when possible, on the advice offered. In the course of the evening Mr. Fletcher was presented by the President, Mr. Hayward, with a handsome gold watch and a pocket aneroid barometer. In making the presentation Mr. Hayward said:—

"There are times when men engaged in the active pursuits of life find it necessary to pause—if but for a moment, and at such times, when the severe strain of competitive business life has been slackened and opportunities afforded to look back across the horizon; and while reviewing the past, there sometimes steals across man's better self the thought that perhaps, after all, the success he may have achieved is not altogether due to his own efforts; that behind the scenes there may have been some sincere, hard-working and thoughtful person who has, by his untiring energy, hewn out the pathway in which we have travelled; removed the barriers and quietly mapped out the way for us to tread; he has found the key, and unlocked the door to nature's storehouse, and, holding the door ajar, bids us enter. The wise have entered and returned fully laden from the harvest. And while we, tonight, gather round this festive board to do honour to our invited guests, we have much pleasure in selecting from among their number one whom we wish to especially honour—a gentleman who has, by his untiring energy and patience, been most successful in causing the unlocking of nature's secrets, and thrown open the door to those who wish to grasp the opportunity. I refer to Mr. Hugh Fletcher, of the



Geological Survey Department of Canada, who tonight occupies the position of the guest of honour, and to whom this Society and particularly those individuals and companies engaged in coal mining, wish to further extend their good wishes by the presentation of a little token of their regard and esteem. Mr. Fletcher, I therefore have much pleasure, on behalf of the Mining Society of Nova Scotia, in presenting you this watch and chain, also an anaroid, and may they remind you of the goodfellowship that exists, and I trust may continue between yourself and the members of this Society."

The watch and anaroid were handed to Mr. Fletcher amid cheers and the company sang "For He's a Jolly Good Fellow."

Mr. Fletcher in expressing his thanks referred to the mining possibilities of Nova Scotia, and said that he had now made the Annapolis Valley his headquarters, which he found to be the nearest possible approach to Paradise. After an admirable programme of songs and recitations a most enjoyable evening was brought to a close.

## MINING IN THE KOOTENAYS.

(From Our Own Correspondent).

Although the month has been quiet in mining circles, inasmuch as there have been no sensational developments, yet there has been accomplished much work in almost every district. Beginning with the Rossland camp it may be marked that the Le Roi concentrator has closed down, the management openly declaring that the constructor of that plant did not know what he was about. This was an open secret in Rossland. The trouble has been in Rossland, so far, that the various experiments which have been conducted along the lines of concentration have not been correlated. Each person has worked along his own lines without any reference to anybody else, although the character of the ore to be treated varies but little. This was carried so far in that unlucky and costly experiment of the Gooderham properties at Trail that barbed wire fence was erected at considerable expense all round the plant to keep people out. The treatment failed for exactly the same reasons as the old Silica reduction works had failed years before, also dealing with Centre Star ore on a modification of the cyanide process. Curiously enough the engineer in charge of the old Silica works, Mr. Gerald Hopkins, and who, therefore, knew of their shortcomings, was the engineer in charge of the Gooderham plant. But the American manager, Mr. E. B. Kirby, dismissed him. Then the \$300,000 plant was erected in direct opposition to Mr. Hopkins' advice. It failed. There was the Elmore process tried upon the Le Roi No. 2 and afterwards upon the White Bear. With regard to the first property it was discovered that the mine had more smelting ore than was at first estimated and on the other hand had hardly any concentrating ore of a \$7 or \$8 grade. The White Bear also proved deficient in concentrating ore. The Velvet-Portland started up an efficient concentrator on a small scale which proved successful but the mine has since closed. The successful part of the Velvet concentrator was the hydraulic classification of the pulp and its treatment on differently set concentrating tables, thereby avoiding much fine and expensive crushing. The Le Roi concentrator seems to have been inexpertly set up and the idiotic mistake was made of placing it on a level site when a sloping site nearer the mine was available and which site would have permitted the use of an aerial tramway already in existence. Consequently the ore had to be trammed to the concentrator and had to be handled more than once when inside as there was naturally no gravity system. This is practically the history of concentration in Rossland up to date and as ore can be treated at \$3 the grade of smelting ore has been reduced and the amount of concentrating ore thereby diminished. Hence concentration is retiring once more into the back ground. But as the ore veins of the camp are not defined by regular walls merely diminishing in value the wider they get there is always ore outside of the walls of the stope which is untouched until the next experiment in concentrating or the next reduction in smelting rates. This means, of course, that a mine developed down to its 1,000 foot level, has above that level much ore, perhaps in some cases, as much as has already been taken out, which is easily accessible when the reduction comes in smelting of concentration. Hence the cheap rate at which the Trail smelter is reducing Rossland ore is a distinct boon to that camp and should lead to much more development than is at present the case.

As Rossland is a camp of big mines so Slocan is a camp of small ones. The leasing system is working well so far and it is freely predicted that the success which has so far befallen the pioneers at this system will induce many hundred miners with small capital to attack other properties in that camp. The good price which lead is now at is further stimulating the industry. Moreover at Kaslo a separator has been erected by Mr. J. Alexander which is reported to be highly successful. The ore at present being treated is that of the Ruth and some 50 per cent.

of zinc is being made in the concentrates which have such iron values (the magnetic system is that employed) as to form a valuable flux for the smelters. So far is this the case that it is asserted that the excess iron units are sufficient to pay the cost of treatment. The separator is as yet only in its infancy and its working is being anxiously watched by the zinc men of the Slocan and of Ainsworth. Nothing further is heard of the zinc plant at Frank but it is thought locally that it will, with the Kaslo separator, help the market of the zinc ores.

The Hall Mines smelter is preparing for the introduction of a process of lime roasting which will reduce the cost of smelting. As the lime process is patented under several patents and as the patentees are at war with one another in the courts, the exact process which will be adopted is not as yet decided upon by the management.

The Trail smelter has now four copper and one lead furnace in blast and a second lead furnace is likely to be blown in during the month of December. The lead refinery is producing about 50 tons of lead daily and arrangements are being perfected at this smelter for the better marketing of its products, especially lead and silver, in the Far East. If the attempt is successful there will be an added market which cannot help being an advantage to the mining industry.

## THE MINES OF WINDY ARM.

Mr. W. Fleet Robertson, the Provincial Metallurgist of British Columbia, recently visited, in his official capacity, the Windy Arm district, in the Atlin mining division, which has lately attracted so much attention.

Windy Arm is a branch of Tagish Lake, the claims being situated near the boundary line between British Columbia and the Yukon territory. It is believed that transportation facilities will ere long be afforded the mines of the district by the extension of the White Pass & Yukon Railway, from Carcross to Conrad City.

The first discoveries of mineral in this locality were made on the Windy Arm slope of a mountainous ridge about 2 or 3 miles north of the 60th parallel. Developments at this point proved eminently satisfactory, and have resulted in stimulating prospective endeavour throughout the region, and during the past summer and autumn a number of claims have been recorded along the range, and on a parallel range lying to the east of Windy Arm.

From the shores of Windy Arm the hills rise rapidly, the lower levels being so covered with wash and slide as to have confined all prospecting to the upper levels—that is from 1,500 to 4,000 feet above lake level. Timber line in this part of the country is found to be at an altitude of from 4,500 to 5,000 feet above sea level, or about 2,000 feet above the lake.

The property at which development work has been carried on to the most considerable extent is that known by the Conrad Consolidated Mines which holds a group of 8 or 10 claims situated at an elevation of from 3,000 to 4,000 feet above the lake, in a comparatively level basin among the high peaks, some 4 miles in a direct line back from the Arm.

The report states that the surface share is covered with heavy wash or slide, in which rich float was found in such a well-defined line as to induce pits and cross-trenches to be dug until the vein was eventually struck in the solid formation upon the Montana, one of the central claims of the group. On this lead a drift had been driven for from 200 to 300 feet, attaining a depth estimated at about 100 feet. From this level stoping had been carried up in places for about 30 feet.

As seen in these workings, the vein was found to be a clearly defined quartz fissure vein between two distinct walls. The hanging wall is the general country rock of the vicinity—a fine-grained, basic, volcanic rock, too much altered to admit of closer determination—while the foot-wall is very much decomposed, rusty, coarsely crystalline, igneous rock, probably a diabase. The vein, as exposed, had a thickness of from 2 to 5 feet, averaging about 3 feet. The strike of the vein was found to be N.W. and S.E., with a dip to the S.W., into the hill, averaging about 25 degrees. On the foot-wall was found a layer from 3 to 12 inches thick of galena embedded in "carbonates," or iron oxides, from which astonishing high assays have been reported, not infrequently running as high as 800 ounces in silver, with \$20 in gold, to the ton.

Above this is the quartz proper, from 12 to 30 inches thick mineralized sometimes more and sometimes less, with iron pyrites and silver and antimony sulphides, from which the management report assays higher in gold but lower in silver, the whole, however, averaging well. The manager estimated the entire vein to run over \$25 to the ton which estimate seemed reasonable. Shipments of sorted ore were being made down the hill by the pack train which brought up supplies, and these shipments were reported as running over \$100 to the ton in gold and silver.



The provincial mineralogist took samples from the upper and lower portions of the vein, representing the two classes of ore rather than the average. These he brought to Victoria, where they were assayed by the government assayer. The results obtained were as follows:

No. 1.—Galena from the lower portions of the vein—Gold, \$13.60; silver, 442 ounces to the ton.

No. 2.—The vein quartz well mineralized—Gold, \$7.60; silver, 113 ounces to the ton.

No. 3.—The "fines" broken in sorting the ore from both portions of vein—Gold, \$17.60; silver, 163 ounces to the ton.

On the strike of the vein as indicated by the Montana workings, a tunnel was driven in on the Mountain Hero, the adjoining claim, through wash for 80 feet, when the solid formation was struck, in which a 50-foot raise was made, when the vein was found containing similar quartz ore, seemingly proving the vein and ore body for 1,800 feet along its strike. The management reports the vein as distinctly traced through at least seven claims by float and occasional croppings, upon which some work has been done.

The company has a Riblet aerial tramway  $3\frac{3}{4}$  miles long, almost completed from the Montana group to the shore of Windy Arm at Conrad City, and has constructed at the mine a stone bunk and cook-house for the workmen, and will, consequently, be able to continue development work all winter with a small force of men.

An Allied Syndicate, the J. H. Conrad Bonanza, has done much development in the way of open cuts on the Venus vein, which lies about half a mile south of the Montana.

The country here is cut by the deep canyon of Pooley creek, apparently a fault line, which has enabled the vein to be prospected at a depth of over 1,000 feet. The strike of this vein appears to be about south-west, with a dip to the west. In the same vicinity this syndicate is also developing a parallel vein on the Uranus claims, on which it is reported some 600 feet of work has been done, developing good ore.

From both of these properties tram lines have been surveyed and the right of way cleared down to Windy Arm, at a point some  $2\frac{1}{2}$  miles to the south of Conrad City.

There are probably 100 more claims located on this slope, on which, as yet, only slight surface development has been done, but in many instances most encouraging results are reported.

From the plans seen of the various properties, it would appear that there at least two main series of veins, an east and west series and a north and south series, which latter series, to the north of Pooley Canyon, bears to the northwest, and south of the canyon to the southwest. It could not be learned that as yet any development had been done on any claim on the west side of Windy Arm south of the 60th parallel. On the east side of the Arm, on Conrad mountain, which is cut by the 60th parallel, a large number of claims were staked late this past summer, but these have not yet received much development, being difficult of access and at an elevation high above the lake.

These locations, however, indicate that the mineralized belt will be found to pass into British Columbia, and that on such extension there is a promising field for the prospector.

The shore of the Arm was followed down to its southern end and the ridge to the west was found to continue unbroken, save where cut into by a couple of creeks.

The geological conditions existing in the vicinity of the Montana claim, appeared to continue to the southward into British Columbia territory and past the southern end of the Arm. The only exception to this was that within half a mile of the south end of the Arm, a bed of hard, dark slate cropped out on the west shore, its contact with the overlying igneous rocks being masked by the surface soil.

A prospector reported that this same slate is cut at an elevation of several hundred feet above the lake by Boundary creek, a creek that flows into the Arm from the west almost exactly on the 60th parallel. This contact, when traced out, should prove a profitable field for prospecting and is worthy of serious investigation.

On the east side of the Arm the mountains are even more precipitous than on the west, and seem to consist for the most part of the same class of igneous rocks seen on the west side of the Arm.

In the vicinity of the British Columbia boundary, about a mile to the east of Windy Arm, a mass of limestone was noted on the mountain side, and from float seen near by, it is probable that a band of slate will also be found on this side of the Arm, although its location has not been fixed. The contact of these sedimentaries with the igneous rocks, so prominent in the district, must be looked upon as likely to contain mineral, and is a section well worthy the attention of the prospector.

**Tyee Copper Company.**—During the month of October the Tyee smelter ran sixteen days, in which period 2,975 tons of Tyee ore were treated, giving a return, after deduction of freight and refining charges, of \$51,237.

## ONTARIO MINERS' MEETINGS.

At an adjourned meeting of mining men at Kenora, early in November, the following resolutions were passed:—"That this meeting recommend that the Government vote an amount of money as an appropriation for the purpose of demonstrating the continuity of the veins in this district to a depth of 1,000 and 1,500 feet, and in the event of the work being done on an existing property that owners of such property to guarantee one half the cost before the work is commenced."

"That this meeting recommend that in cases where lessees of mining properties have done development work and expended money in improvements thereon to an amount more than sufficient to cover the cost of acquiring title in fee simple to the properties in question, special consideration should be given, and unless in cases where evident abandonment has taken place, a patent should be granted in respect of such properties."

At the Sault Ste. Marie meeting, to which we made brief reference last month, the following excellent suggestions were made:—

1. That all lands belonging to the Crown whether surveyed or unsurveyed and whether valuable for pine or not should at all times be open for exploration and sale, and that no lands should at any time or under any circumstances be withdrawn from exploration or sale by Order-in-Council or otherwise.

2. That all applications for mining lands in each of the districts of Rainy River, Thunder Bay, Algoma and Nipissing should be made exclusively at one or more local offices in such district, and no applications for such lands should be received or dealt with at the Crown Lands Department in Toronto except through such local offices, and that such local officers should have powers similar to that of inspectors of mining division.

3. That every applicant should be required to stake out his mining location whether for surveyed or unsurveyed territory in the same manner as required by the regulations for mining divisions, and cause his application to be filed with the local agent within thirty days after his discovery, and immediately receive a location certificate from such local agent entitling such applicant to exclusive possession of such mining location during the validity of his title thereto.

4. That such application should be required to expend at least fifty cents per acre whether for surveyed or unsurveyed territory during ninety days immediately succeeding such discovery excluding from such computation the months of November, December, January, February, March and April, and also a similar amount during the next succeeding four years or prior thereto, but such expenditure shall be computed at the rate of \$3 per day for each day's work performed by a grown man, and that an affidavit proving such expenditure be filed with the local agent in the district in which such location is situate within thirty days after the time allowed for the performance of each such expenditure.

5. That an applicant complying with such provisions and filing an affidavit verifying such compliance should have twelve months from the time of such discovery to pay the first year's rental.

6. That the applicant upon paying his full purchase money and filing evidence of full performance of the development work should be entitled to a patent for such mining location but not before the performance of such development work.

7. That the size of mining locations shall not be less than forty acres, nor more than one hundred and sixty acres.

8. That the principles set forth in sub-sections c, d, e, f, g, h, i and j of the resolutions with regard to regulations for mining divisions hereto annexed be applied in amending this Act as far as may be.

9. That all specific royalties on ores and minerals should be abolished.

That in the opinion of this meeting the inspection of discoveries as provided by Orders-in-Council of 8th July and 18th August, 1905, is impracticable and very unsatisfactory, and should immediately be abolished, and that such inspection has done very great injury to mining in this province.

That in the opinion of this meeting one of the worst defects of the present Regulations for mining and of the Mines Act is that there is uncertainty of title to and possession of locations staked out and developed thereunder, and the above resolutions are largely designed to correct this defect in the Regulations for Mining Divisions and the Mines Act.

That in the opinion of this meeting the uncertainties created by the royalties on ores and minerals under the Mining Act being subject to the imposed or remitted by Order-in-Council has been most injurious to mining.

That in the opinion of this meeting the fact that nine-tenths of New Ontario is not opened for prospecting has been greatly retarded development of the mineral resources of this province, and that such mineral resources will never be developed until all government lands in the province are thrown open for prospecting.



That in the opinion of this meeting the province of Ontario should erect a smelter and refinery capable of smelting, treating and refining the silver Cobalt ores, and should make provisions for the experimental treating and refining of the iron, copper and nickel ores of the province.

Our special correspondent writes:—

The mutiny of those interested in mining, for the Toronto district, to discuss changes in the mining law, and appoint delegates to the general meeting on December 12th, which was called for November 27th, was very largely attended. Mr. W. D. McPherson occupied the chair and Mr. S. Dillon-Mills was appointed secretary. There was very full discussion on the various points brought up, but the views of the majority were finally embodied in the following resolutions:—

"That a mining law applicable to the whole of the province of Ontario should be passed by the Legislature."

"That it would be injudicious to provide for payments of any royalty or for a special tax applicable to the mining industry."

"That any license issued shall entitle the holder there to stake and hold mining locations in all parts of this province."

"That all Crown lands, whether valuable for timber or otherwise, should be open for prospecting."

"That the Ontario Government be requested to offer a prize for the demonstration of a satisfactory method of treating refractory ores of Ontario, for which a satisfactory method is not at present known."

"That in the opinion of this meeting no bounty should be paid on iron or steel made from ores imported from outside the British Empire."

"That contests arising regarding the location and ownership of mining claims should be decided by a mining commissioner sitting judicially at various mining centres, and whose decisions should be subject to appeal to the appellate courts of the province in the same way as judgments of the county courts are now applicable."

"That a committee of seven or more be appointed to receive the resolutions passed at this meeting and appear at the general meeting on December 12 to forward the same."

The following were appointed delegates to the general meeting to be held at Toronto on December 12th:—

Messrs. W. D. McPherson, Dr. W. T. Stuart, John Shilton, J. M. Clark, K.C., W. G. Trethewey, S. Dillon-Mills, J. W. Cheeseworth, H. Dreany, R. K. Sproule, L. A. Morrison, W. D. Gregory, W. H. Walbridge, Fred Fenton, T. D. Ledyard, Dr. J. E. Elliott, R. W. Leonard, Thos. A. Drew, T. R. Dewar, C. B. Jackes, Prof. W. G. Miller, T. W. Gibson, Dr. A. E. Barlow, C. C. Farr, J. A. Proctor, Geo. A. Kingston, Dr. J. McMaster, C. J. Agar, W. L. Hime, W. M. Marsh, John Webber, Prof. Latimer, and G. M. Mickle.

At the Sudbury meeting, held on November 1st, it was resolved that the Mines Act should be amended in the following respects:—

1. That all Crown lands, whether valuable for timber or otherwise, should be open for prospecting.

2. That all territory valuable for mineral should be formed into divisions, to be called Mining Divisions, with a recording office in each division, and that all applications for mineral should be made to the recording office of the Division in which the mineral is found.

3. That each recording office should have on file all applications and records for its division, and also maps showing all locations, which should be open for inspection by prospectors.

4. For the purpose of an affidavit of discovery, vein matter or rock, in place, indicating presence of mineral should be considered a discovery of mineral.

5. That the size of the mining location should be 40 acres for precious minerals, and 160 acres for the base minerals, but an applicant may apply for a smaller location of not less than 20 acres.

6. Where a lake occurs in a mining location, the limits of the location should extend to the high water mark, subject to the usual regulations respecting road allowances, fishermen's rights, etc.

7. That all applications should be filed within fifteen days after the date of discovery, providing that one day extra be allowed for every five miles beyond the first ten miles in distance from the proper recording office.

8. That after the expiration of 15 days or longer, as the case may be, from the date of filing of the application, a certificate of Record should be issued from the office where the application is filed.

9. That a mining location should be marked or staked out by planting a discovery post of wood or iron (on which is written or stamped the name of the discoverer, the number of his license, and date of discovery) upon an out-cropping or show of mineral or rock, in place, within the boundaries of the location and by planting at each of the four corners a post of wood or iron in the order following, namely:—No. 1, at the north east corner; No. 2, at the south east corner; No. 3, at the south west corner; and

No. 4 at the north west corner; the number in each case to be on the side of the post towards the post which follows it in the order in which they are named.

(2) In surveyed territory the location should consist of a fractional part of a lot as mentioned in sub-section two of section 18, of the Regulations for Mining Divisions governing the Temiskaming Mining Division.

(3) That where there are standing trees upon a location so staked out, a blazed boundary line should be run (by blazing into the wood on two opposite sides of the trees in the direction of the line) so as to be distinctly seen, and the underbrush should be cut along the line; and a blazed line should be run from the north east post to the discovery post.

10. That the north east angle of the location as fixed by the prospector should be the point from which all surveys should be made, and that priority of claim should be observed in fixing the limits of the locations in the locality.

11. That \$100 per year should be expended on each location for a period of four years in actual mining work to be computed at the rate of \$3.00 per man per day, provided that the total amount of work may be performed in a less period at the option of the applicant; all such work to be performed before a patent can be obtained.

12. That affidavits showing quantities of work performed should be filed within thirty days after such work has been done.

13. That section 36 should be cancelled so as to leave the working conditions regarding iron ore the same as in regard to all other ores.

14. That the price of mineral lands should be uniform all over the province; at the rate of \$2.50 per acre in surveyed territory, and \$2.00 per acre in unsurveyed territory.

15. That the school tax of one cent per acre on patented lands in unorganized territory in Algoma should be abolished.

16. (1)—That the uniform price of two dollars and no more should be charged for Mining Licenses.

(2)—That no application for lands be recorded except in the name of the licensee.

(3)—That discovery must be made subsequent to the date of the applicant's license.

(4)—That a fee of \$5.00 be charged for the recording of each claim at time of application.

17. That rule 23 of the regulations for Mining Divisions should be amended so that the fees of \$10.00 and \$6.00 respectively, for recording additional claims should be \$5.00 and \$3.00 respectively, and that the fee for recording assignments of locations should be \$10.00 instead of \$5.00.

18. That there should be a right of appeal to a proper Court of Law, from all the decisions of agents or inspectors.

19. That all affidavits required under this Act, may be sworn to before any Justice of the Peace, Notary Public, Commissioner for taking affidavits in the High Court, and any agent appointed under this Act or any Crown Lands Agent.

That a special Court should be created for the hearing of mining disputes, and appeals from decisions of inspectors, and that provision should be made for having mining cases decided quickly and at a minimum cost.

That the making of radical alterations in the mining laws by means of Orders-in-Council is strongly condemned.

That the imposition of royalties would be injurious to the mining industry and cannot be too strongly condemned.

That the Government should investigate the smelting and refining industry with a view to ascertaining whether the silver cobalt ores and nickel copper ores can be profitably refined in this Province.

That in view of the increasing importance of the mining industry, it is desirable that a commission should be appointed to investigate the condition of the industry and collect information concerning the mineral resources of the Province and measures for their development.

That the present mining law has, in general, proved satisfactory, and with the amendments above suggested, should be found a liberal protection to the prospector and the mine owner.

The following delegates were appointed to attend the Mining Congress to be held in Toronto: Mayor O'Connor, and Messrs. J. F. Black, G. A. Loney, A. P. Turner, President of Canadian Copper Company, W. W. Stull, J. K. MacLennan, and Major J. R. Gordon, and such others as the Chairman should designate.

## COBALT.

The Dominion Government's Trade Agent at Manchester writes:—The reports from Canada concerning cobalt mining has caused inquiries to be made here regarding it. A chemical company wishes to obtain an approximate analysis of the ore, quantities, price per gross ton and terms. They are of opinion that large quantities could be placed in Great Britain in the crude state. If their view is correct (freight rates not being prohibitive), the excessive charges for smelting will be averted, and better profits will result to the shippers.



## HALL MINING &amp; SMELTING COMPANY.

We publish elsewhere in the issue a review of the report recently issued by this company at its annual meeting, held in London on October 30th, but to this may be added the report of Mr. R. R. Hedley, the smelter manager, which contains several matters of interest. Mr. Hedley reports as follows:—

No. 1 blast furnace has been in operation 264 days and No. 2 furnace 290 days, which figuring their respective capacities means 76 per cent. of the time, which agrees very closely with 1904. We have smelted 5,138 tons of dry ores, 8,210 tons of lead ores not roasted, and 8,281 tons of roasting ores, including a large quantity of lead concentrates. In addition to this, the fluxing ores, Emma and Standard, have been 12,475 tons. The bullion shipped amounted to 7,603 tons. We also shipped 252 tons of concentrated copper-lead matte, the total content of these two items being 1,206,920 ounces silver, 9,021 ounces gold, 40 tons copper and 7,436 tons lead, with a total valuation of about \$1,100,000.

From a technical point of view the work of the past year has been highly satisfactory and has given excellent metallurgical results and our metal recovery has been abnormally high. This is due to a constant watchfulness and attention to minute detail of metallurgical practice. Considering that, with the low tonnage available, the low treatment rates did not cover operating expenses, this should be a matter of congratulation.

The ore supply has, as usual, been very capricious. At times the stocks have been large and of suitable character. At other times we have been obliged to shut down one of our furnaces for lack of ore. The situation has improved since the beginning of the year, and I trust will continue to the end.

The expenditure on maintenance and construction has been heavy, amounting to \$27,000 for maintenance and \$16,000 for construction and plant. The heaviest items of maintenance have been \$8,378 for the blast furnaces, \$6,048 for roasters and briquetters, and \$7,202 for general maintenance. In new plant and improvements, the heavy items are \$7,664 for the Merton furnace and \$3,560 for bag house and extension of flues and ventilation. Commenting on this, I may say that much work has been done with a view to the permanent improvement of the plant. The sample mill being inadequate, was increased in size and the unloading platform lengthened, facilitating the handling of a greater number of cars at a time. Much, however, remains to be done in this department to bring it to the standard of efficiency of the remainder of the works. The advantage of this work will be seen in the reduced cost of handling and sampling. New and substantial gravity bins were provided in connection with the new track system for holding concentrates and roasting ores, which were necessitated by the increased roasting facilities afforded. The new elevator, completed this year, in connection with the roasters and lower yard, handles very efficiently the product of the three hand roasters and the Merton, at a very small cost, to an automatic tippie at a high level above the upper yard, affording thereby a greater storage than before. This will also be used to convey foul slags and similar material to receiving bins. The feed floor has been completely renewed, the old floors having become unsafe. At the furnace level much was done towards improving conditions by laying a cast iron flooring about the furnaces and improving the facilities for the handling of matte, etc. Tuyeres of a new design have been provided to replace the obsolete ones on the small blast furnace, which were leaky and unsafe. Additional jackets for No. 2 furnace were also installed, that furnace being water jacketed from top to bottom and independent of the brick work above the tuyeres, gaining the advantage of being able to clean out the shaft with less labor and in a fraction of the time before necessary.

The most important improvement about the furnaces, however, has been the separator designed by Mr. Harris, which does away with the large and cumbersome settlers, with all the expenses entailed in handling, and gives us a very much better reparation and, therefore, generally cleaner slags. The principle of the settler is that the separation of the matte from the slag takes place within the furnace, at the greatest heat, and maintains it in passing from the furnace to the separator, which occupies but little space, and which permits the matte to flow under a water jacketed partition, filling a small compartment with a constant overflow, while the slag is forced to flow from the original compartment. These settlers it will be perceived obviate the customary remixing of matte and slag as they drop into the large settler, and we find that an ordinary cast iron box with about 10 cubic feet capacity, instead of about 50 cubic feet as before, quite sufficient for settling purposes, from which the slag flows to a granulating flume. These small settlers are easily handled by a shain block and travelling trolley.

Natural means of effecting ventilation failing, and finding it impossible to expect good work from men working daily in a vitiated atmosphere, it was decided to introduce a system of mechanical suction. Hoods and pipes were provided in connection with a large suction fan, and the fumes therefrom forced

into a small bag house, where the valuable constituents could be saved. This had not long been completed but may already be considered a success.

Considerable expense was incurred in strengthening our large mechanical roaster; a section of the lofer arch was replaced by new work of more substantial design and build, with the result that the furnace has now been doing good work for the past seven months almost continuously. We may confidently expect that the brick work of this roaster will give us no further trouble, especially as regards the new section. The capacity of the roasting plant was further increased by the addition of our Merton furnace. Several changes in the detail of construction of this machine have been necessary to meet our conditions, but the expectation, based on the satisfactory operation during a short period, is that the furnace will materially decrease our roasting costs. It was found necessary to increase the size and length of our flues which connect the roaster with the main flues.

My last report mentioned the construction of a new hand roasting furnace of our own design. This furnace has been eminently satisfactory, being more economical in both fuel and labor for a similar result of efficiency.

The equipment of the machine shop has been improved by the addition of more machinery. The operation of this department saves much money in the maintenance of our machinery in general.

We have been very carefully investigating the merits of improved processes for smelting lead ores, and have acquired a very great deal of extremely interesting information on the subject, and trust that during the current year we may be enabled to instal a plant that will adopt one of these several improved processes to the advantage of smelting operations.

I must express myself as very well satisfied indeed with the services rendered by the heads of departments, especially by Mr. Harris, who has been untiring in his zeal and devotion to the company's interests. Yours faithfully,

(Signed) ROBERT R. HEDLEY,  
Smelting Manager.

## MINE ACCOUNT.

|                                                                                                                        | £    | s. | d. |
|------------------------------------------------------------------------------------------------------------------------|------|----|----|
| To expenditure (prior to partnership with M. S. Davys)—including safeguarding of property, insurance, taxes, etc. .... | 106  | 17 | 9  |
| To depreciation of Stocks (principally mine timbers).....                                                              | 632  | 14 | 9  |
| To Balance, being profit.....                                                                                          | 159  | 8  | 6  |
|                                                                                                                        | £899 | 1  | 0  |
| By Royalty (prior to partnership with M. S. Davys) on ore output by tributers.....                                     | 360  | 8  | 1  |
| By sundry receipts, including interest .....                                                                           | 538  | 12 | 11 |
|                                                                                                                        | £899 | 1  | 0  |

## SMELTER ACCOUNT.

|                                                       | £        | s. | d. |
|-------------------------------------------------------|----------|----|----|
| To purchase of customs ore .....                      | 170,525  | 6  | 5  |
| To Freight, expenses and interest .....               | 13,626   | 16 | 8  |
| To Administration expenses.....                       | 2,909    | 6  | 7  |
| To Smelting expenses.....                             | 42,003   | 3  | 4  |
| To outside expenses.....                              | 1,762    | 5  | 7  |
| To maintenance of buildings, plant and machinery..... | 5,603    | 13 | 2  |
| To Balance, being profit.....                         | 5,094    | 14 | 0  |
|                                                       | £241,525 | 5  | 9  |
| By value of Bullion, etc., produced .....             | 241,996  | 0  | 1  |
| Deduct expenses on same .....                         | 470      | 14 | 4  |
|                                                       | £241,525 | 5  | 9  |

## GENERAL ACCOUNT.

|                                                                                 | £      | s. | d. |
|---------------------------------------------------------------------------------|--------|----|----|
| To general expenses of the Company—in B. C. and London.....                     | 1,812  | 14 | 0  |
| To debenture interest.....                                                      | 1,473  | 12 | 0  |
| To Exchange.....                                                                | 14     | 19 | 3  |
| To Balance, being profit.....                                                   | 6,023  | 1  | 2  |
|                                                                                 | £9,324 | 6  | 5  |
| By profit on Mine Account .....                                                 | 159    | 8  | 6  |
| By profit on Smelter Account .....                                              | 5,094  | 14 | 0  |
| By profit on working Emma Group of Mines. . .                                   | 2,849  | 15 | 10 |
| By sundry receipts in London and B. C., and profit on sundry transactions ..... | 1,220  | 8  | 1  |
|                                                                                 | £9,324 | 6  | 5  |



## ONTARIO MINING INTELLIGENCE.

(FROM OUR OWN CORRESPONDENT.)

The following mining lease has been cancelled by the Minister of Lands and Works for Ontario for non-payment of rental:—Lease granted 31st Oct, 1900 to T. C. and L. Carlton and by them transferred to the Flint Lake Gold Mining Co., Limited, as to McA 285, 138 acres, and to the Westerfield Mining and Investment Co., Limited, as to McA 286, 140 acres, both in the District of Rainy River.

A graphite property near Denbigh, Ont., owned by J. G. Allan, of Hamilton, is to be taken over and operated by the Allanhurst Co.

Some specimens of native copper which appears to be very rich are on exhibition at the office of the C. P. R., Toronto. They come from a deposit near the Soo branch of the C. P. R. The vein is said to be 2 miles long and from 4 to 21 feet wide.

A one-tenth interest in a group of iron properties in the Hutton iron range (Moose Mountains) has been sold to Mr. Gates, of Chicago, a director of the United States Steel Co., for \$250,000 in cash. Arrangements are meanwhile being made to work the property on an extensive scale, and it is expected will result in a large increase in freight for the C.P.R. and business for the James Bay road, which will extend its Toronto line to Hutton.

The shipments of grain corundum of the Canadian Corundum Co. for the month of November amounted in the aggregate to about 400 tons.

The statement which has appeared in many of the papers that the Hart Corundum Wheel Co. and the Canadian Corundum Wheel Co. have amalgamated is incorrect. There have been some negotiations, but nothing has come of them.

Messrs. Mackenzie & Mann have purchased from Mr. Spry, of Chicago, and Chas. Osborne, of the Michigan Soo, a minority interest in Moose Mountain iron deposits for a price which makes the whole value of the property \$2,500,000. They are now negotiating for another small interest.

Canadian Mines, Limited, a company with headquarters in Toronto, is working on a new process for separating molybdenite from the rock, and when the machinery is perfected they purpose working deposits which they hold in various parts of Ontario. They also hold very promising deposits of mica in Loughboro township, close to the mine of the General Electric Co. of New York, and on the Gatineau. There is such a good demand for mica that they consider the latter better than a gold mine.

Messrs. Mackenzie & Mann are about to let a contract for an extension of the James Bay Railway to the north nickel range. Docks are also to be built at the mouth of the French River at which coal will be discharged.

Further discoveries are reported of silver and cobalt beyond Tomstown on the Blanche River, about 80 miles north-east of Cobalt. The veins are said to be wider than those found at Cobalt.

The Fairbank Co. is arranging to resume operations on their gold properties in the township of Dunistown.

The Trotter property near Webbwood, Ont., is again on the market, Mr. A. D. Bailey, who was sent out from England by the Tarsus Sulphur and Copper Co. and who did some development work on it, having withdrawn. Mr. Bailey sunk a shaft 45 feet, and a couple of pits. The rock is copper pyrites and shows as high as 6½ per cent of copper, but it does not seem to have satisfied the Tarsus Co., which engage only in large undertakings. There are a number of copper properties in that part of Ontario which are too small to be worked singly, but if grouped and joined by rail or tramway could be worked economically and made to pay.

Further deposits of felspar, in paying quantities, are reported to have been found on the north shore of the Rideau. Felspar is being mined in the county of Frontenac, and it is probable these deposits, if they exist, are part of the same formation.

No report of the oil well gusher which newspaper report says has been struck in Manitoulin Island has reached the Ontario Department of Mines. That there is oil to be found on Manitoulin does not admit of doubt, but the field is too shallow to warrant the hope that it exists in such quantities as indicated by the alleged strike.

Everything points to great activity in mining for next year, and the Ontario Bureau of Mines anticipates development in Northern Ontario far beyond anything hitherto experienced. It is to be hoped a damper will not be put on the industry by wildcat schemes which are so apt to be brought forward at such a time.

Mr. H. L. Kerr, who was sent out on an exploratory tour of the Metagami district, has handed in his report. The region is largely agricultural land with not many exposures of rock. Where they do occur they are largely Huronian. Mr. Kerr found traces of galena and iron. The marshes contain excellent peat.

Sir Richard Cartwright has, in the Divisional Court, again won his suit with the Bullion Mining Co. Sir Richard had given two promissory notes of \$3,000 each to cover shares in Bullion Co. (No. 2), which was in process of formation and was to take over the assets of Bullion Co. (No. 1). One of these notes had been paid and the company sued for the other. As the deal between the two companies had never gone through, and the shares were never delivered, the trial judge found in Sir Richard's favour, and ordered the return of the \$3,000 already paid. The company appealed to the Divisional Court, which has affirmed the judgment of the trial judge, Mr. Justice Britton.

There is a prospect of a revival of the phosphate industry in the near future. The Carolina deposits are almost exhausted and the price has now reached such a figure as to encourage the opening up again of the mines in Canada.

The difficulty of treating the low grade copper found ores at Massey, Ont., has been overcome. The Massey Station Copper Co. has been operating for three years and has spent about \$300,000 in experiments. By a modification of the Elmore process a concentrate of 20 per cent can be turned out from a 3 per cent ore.

Representatives of a United States syndicate, said to be worth \$60,000,000, have been in New Ontario investigating some silver properties about Cobalt on which they have secured options. They took with them a well-known expert. It is their intention to send out exploring parties in the spring to make search for further deposits.

At a meeting of the shareholders of the Payne Consolidated Mining Co., Limited, a lease of the property of the company for three years to Mr. Walker Smith was approved of, the substance of which is that the company is to receive 15 per cent of the net smelter returns on any ore taken out of the mine, the lessee being limited to take such ore to a depth not exceeding 200 feet below No. 8 tunnel. The affairs of the company are not in a very satisfactory condition and a circular has been sent out to the shareholders explaining the position and offering them the opportunity of subscribing for bonds, by which means their interests would be placed in a better position. It is probable the mortgage on the property will be foreclosed.

New York capitalists are arranging to spend at least \$12,000 in development at the Harmony Copper Mine north of Sault Ste. Marie.

The Hamilton Nickel Co. is negotiating with a United States company to resume operations. They propose to introduce the Orford process which they claim is not protected by patent in Canada.

Mr. Jas. Curry, a Toronto broker, is trying to bring about a consolidation of all the mines at Cobalt. They would, if the amalgamation is carried out, erect a smelter and smelt their own ores.

The only competition the Canadian Corundum Co. has had in that industry has disappeared from the field. About six months ago the Ontario Corundum Co., operating in the township of Carlow, sold out to the Ashland Emery Co., a subsidiary company to the Ashland Co. of the United States. The latter brought over some machinery from one of their mills in the United States, but business troubles have arisen and the works have been closed. It seems likely that the property will revert to Mr. Thos. Armstrong, of Carlow, who sold it to the Ontario Corundum Co.

Among recently incorporated companies is the Windy Arm Syndicate which has interests in some 48 mineral claims lying in the Yukon district, at Windy Arm Lake near Carcross or Cariboo Railway station on the White Pass & Yukon Railway. The district in which the mines are situated is extremely rich in silver, gold and lead ores with small showings of copper. Development work is to be proceeded with at once. The company is composed of Toronto men, and Mr. Armour, one of those interested, is in Europe making financial arrangements. The property controlled by Mr. J. H. Conrad, at the same place, has been turned over to a joint stock company composed of the same persons.

What will probably be a test case as affecting the Cobalt mining camp came before the Minister of Lands and Mines for Ontario recently, in *Gaizer v. Thompson*, in which an application was made for a fiat to issue to set aside a lease on the ground that no discovery of valuable minerals had been made. The matter was argued by J. M. Clark, K.C., for the applicant, and E. F. B. Johnson, K.C., for the lessee, but no decision was given,



nor will there likely be till an authoritative interpretation has been laid down of the words "discovery of valuable ore or mineral" in the Mines Act. There are a number of such cases pending, and there is likely to be much litigation, both before the Minister and in the Courts over disputed claims at Cobalt. In cases where the inspectors have decided that there has been no discovery, the applicants have the right to appeal from the ruling of the inspectors within 20 days, and there are a number of such appeals in, most of which are standing for argument.

A very interesting paper on the manufacture of steel was given at the Toronto Engineers Club recently by Mr. Samuel Groves, editor of the *Canadian Engineer*, 1904, lecturer on mines, furnaces, and foundry to the Carnegie Technical Schools, Pittsburgh, Penn., and late foundry engineer to the Westinghouse Machine Co., Pittsburgh. Mr. Groves described the three methods of steel manufacture—the Bessemer, the open hearth furnace and the Tropenas system. The latter he pronounced the best. His deductions were made more intelligible by diagrams. Mr. Groves, who has given many years study to the manufacture of iron and steel, has great faith in the future success, of iron smelting by electricity, the experimental plant in connection with which, at Sault Ste. Marie, will be in operation in a few days. In this he agrees with Dr. P. I. T. Heroult, technical director of the French Electro-Metallurgical Society, which has immense works at La Praz, France, where aluminum and steel are produced. Dr. Heroult, who is one of the first authorities on electric smelting, says that in ten years Canada will have iron industries larger than any country in the world, and that they will be worth more to her than her wheat fields. Mr. Groves pins his faith to Dr. Heroult's opinion.

An examination of Jackfish gold mine by an English engineer has led to a recommendation that the mine should be equipped with a larger and more expensive machinery plant to carry on operations than was first contemplated. The equipment as proposed would, it is estimated cost in the neighborhood of \$125,000. The company is therefore endeavoring to raise additional funds for this purpose.

## NOVA SCOTIA MINING INTELLIGENCE.

Our special correspondent sends the following list of mining areas applied for during the month:—

| DISTRICT.                     | AREAS. |
|-------------------------------|--------|
| Stormont.....                 | 181    |
| Big Liscomb Lake.....         | 6      |
| Killag.....                   | 55     |
| Leipsigat.....                | 27     |
| Lawrencetown.....             | 6      |
| Fifteen Mile Stream.....      | 54     |
| Lochaber.....                 | 18     |
| Gold River.....               | 7      |
| Ragged Falls.....             | 91     |
| East River Sheet Harbour..... | 12     |
| Millers Lake.....             | 34     |
| Tangier.....                  | 34     |
| Voglers Cove.....             | 9      |
| Broad River.....              | 12     |
| East Rawdon.....              | 28     |
| Brookfield.....               | 65     |
| Somerset.....                 | 6      |
| Oldham.....                   | 33     |
| South Uniacke.....            | 8      |
| Wagamatkook.....              | 20     |
| West Gore.....                | 206    |
| Salmon River.....             | 6      |
| Montague.....                 | 70     |

## MINING MEN AND AFFAIRS.

Mr. A. C. Galt, the well-known barrister of British Columbia, and legal adviser of the War Eagle and Centre Star companies, is leaving Rossland, where he has resided since 1896, in order to practice in Victoria, where he has opened offices in the Board of Trade Building.

Mr. J. H. Ellis has resigned the superintendentship of the Bannockburn Lead Mine Properties, Ontario, and is succeeded by Mr. G. W. Burnett of New York.

Mr. C. H. McMillan, formerly of Ensly, Pa., has joined the staff of the Dominion Iron & Steel Company as engineer in charge of the open hearth department.

Mr. W. R. Ingalls, in an interview with the *Nelson Daily News*, stated that the Zinc Commission proposes to return and continue the field work in British Columbia next spring. The work this year was confined almost entirely to the Slokan dis-

trict. The object of the commission, he pointed out, was not to include the appraisal of any mine, or to approve or condemn any special process or method of treatment, but that after the tests shall have been made at Denver this winter the Commission will no doubt be in a better position to suggest the most economical method, or methods, of treating British Columbia zinc ores. The report that the Commission was refused access to some of the mines is incorrect.

The *Victoria Colonist* announces that Mr. J. W. Haskins, manager of the Rosella Mining Company and proprietor of a number of claims in the Cassiar district, has received an offer from a Chicago investor to purchase "a half interest in the immense deposits of zinc and copper ore on Haskin's Mt.," for which he offers to pay the large sum of \$350,000.00. Mr. Haskins is a well-known British Columbian "mining optimist," and can spin a yarn with the best of them.

Mr. S. F. Parrish, formerly manager of the Le Roi mine, has been, it is reported, appointed manager of the Morning mine in the Coeur de L'A owned by the Federal Mining Company. It is also understood that Mr. Parrish is also acting as consulting engineer.

Mr. C. F. Webster, Mining Engineer for the Transcontinental Development Syndicate, has spent the summer in the Skeens and Telequa River districts, and reports that a promising semi-anthracite coal property, producing an excellent fuel for railway purposes, is being opened up by the company.

Mr. P. Kirkgaarde has left Deloro, Ontario, and is now at Cobalt, in connection with the proposed erection of the reduction works there.

It is reported that a Mr. H. S. Ferguson, a hydraulic engineer of New York, is investigating the water powers in the vicinity of Waverley, B.C., on behalf of the company, and is negotiating with the former owners of that property for the purchase of the Waverley and the water rights. The Waverley, it will be remembered, was one of the Grant Govan promotions.

Mr. Robert Jaffray, Vice-president of the Crow's Nest Pass Coal Co., recently returned from a visit to British Columbia, where, with Mr. G. G. S. Lindsay, General Manager, and several of the directors, a week was spent at the mines. A number of improvements have recently been made, including a tippie and screening plant at Coal Creek and compressed air locomotives for hauling at Michel. Everything is working satisfactorily at the mines. The men are contented and earning good wages. Shipments are somewhat hampered for want of cars. A sale of 20,000 tons of coke for delivery at Salt Lake, Utah, was not filled because cars could not be secured. A large tonnage of coal has, however, been sold to railways in the United States, but long hauls and a duty of 67 cents a ton interfere with the export trade. Mr. Jaffray expresses himself strongly in favour of making coal free both in Canada and the United States. He has great faith in the future of British Columbia, especially her mining industries.

Mr. J. H. McKenzie, manager of the Le Roi Company, and Mr. W. H. Aldridge, of the Canadian Smelting Works, sailed on the s.s. "Baltic" from New York on Nov. 15th, to attend the meeting of the Le Roi Company, which, it was expected, would be held on the 30th of November, or early in December.

Mr. A. H. A. Robinson, who for the past three years has acted as surveyor with the Intercolonial Coal Mining Company, Westville, N.S., has resigned that position, and has joined the engineering staff of an important copper undertaking in Arizona.

Mr. J. W. Astley, formerly manager of the Le Roi mine, passed through Montreal early in December en route for England. Mr. Astley, we regret to say, is suffering from very poor health, and does not anticipate returning to Canada.

Before Mr. Astley left Rossland he was presented by the employees of the Le Roi Mine with a case of silver plate, and by the business men of Rossland with a fine set of silver fish knives and forks.

Mr. Robert Archibald, C.E., has been appointed manager of the recently incorporated Eastern Coal Company, operating at Maccan, N.S.

Mr. Arthur Clare has been appointed head amalgamator at the Second Relief mine, Erie, B.C. Mr. Clare was in charge of the Ymir mill for a period of 5 years, and recently was employed at the Eagle Plate mine at Hedley.

Mr. C. H. McMillan, formerly president of the open hearth plant at Ensly, Pa., recently joined the staff of the Dominion Iron & Steel Company, as an assistant to Mr. Jones, the general manager.

Mr. J. C. Foley, general manager of the Shakespeare Gold Mining Company of Webbwood, Ontario, died suddenly at the mine on Dec. 1st, from heart failure.



Mr. Robert Anderson, formerly superintendent of the B.C. Mine, Boundary District, and of the Le Roi, Rossland, returned to British Columbia after an absence of some months in Salt Lake City, Utah.

The death occurred in Ottawa last month of Mr. J. A. Gemmell, the well known barrister of that city, who was also identified with the early history of the Crow's Nest Pass Coal Company. Mr. Gemmell was very widely known, and his loss is keenly felt.

Mr. J. C. Mitchell has resigned the managership of the Inverness Collieries, and has joined the staff of Dominion No. 1. Prof. Lischmann, instructor of the mining classes at King's School, Glace Bay, has already organized the work there, which promises to be most successful. The Dalhousie classes at Sydney Mines have also been well attended, no less than 125 students having been enrolled during the last few weeks.

The American Institute of Mining Engineers announced a meeting to be held on Feb. 21st at Lehigh University. Papers offered for this meeting should be in the secretary's hands before Dec. 31st, 1905. A joint meeting with the Iron & Steel Institute is to be held in London on July 23rd, and will continue for about two weeks. In reference to the recent excursion to British Columbia, a descriptive narrative has been prepared by the secretary, and will be found in the November number of the bi-monthly bulletin now in press. This narrative comprises about 75 pages of reading matter, and is illustrated with more than 50 engravings. It will also be published in a limited separate edition, for which \$1.00 per copy will be charged.

The Geological Survey has sent the Duke of Argyll, a former Governor General of Canada, a sodilite stone base to be used in a monument to the Duke's father. The stone was procured in the Princess quarries in Dungannon, Hastings County, by Mr. Charles W. Willmott of the Geological Survey, who located rich deposits there in 1893. When the Duke was in Canada, he was much attracted by the richly colored blue stone, and the Princess took similar interest in the quarries then being worked. She allowed one of them to be named after her.

## MINING STATISTICS.

The output of the Crow's Nest collieries for the month of October was as follows: Coal Creek, 32,744 tons; Michel, 24,232.17 tons; Carbonado, 7,838.04 tons; total, 64,815.01.

The Dominion Iron & Steel Co's output for October was the largest in the history of the company. The output of the open hearth furnaces for the month was 18,915 gross tons of steel, and of the blooming mill 15,262 tons.

The returns of lead shipments to the Trail smelter during October show production to have been made by 20 lead-producing mines to the extent of 2,313,682 lbs., which yielded 944,852 lbs. of lead. To the Hall Mines smelter 2,676,705 lbs. of ore was shipped from 33 mines producing 672,949 lbs. of lead. The price during the month ranged from £14 2s. 6 d. to £15, and bounty was paid by the Dominion at the rate of from 20.68 to 39.69c. per 100 lbs.

Shipments from Nova Scotia collieries during the month of October were as follows:—

|                                            |              |
|--------------------------------------------|--------------|
| Dominion Coal Company .....                | 323,884 tons |
| Acadia Coal Company .....                  | 26,994 "     |
| Cumberland R'y & Coal Co. ....             | 41,904 "     |
| International Coal Co. ....                | 20,805 "     |
| Inverness R'y & Coal Co. ....              | 19,617 "     |
| Nova Scotia Steel Co. (Sydney Mines) ..... | 50,369 "     |

Total shipments from the Boundary District for the year, to the end of November, aggregate 833,744 tons; from Rossland 303,183 tons.

Shipments from the Cumberland Railway & Coal Company, Springhill, N.S., for November, aggregated 40,473 tons.

## MINING NOTES.

### QUEBEC.

The Chibogamoo Mining Company, which has acquired valuable mineral areas in the new Chibogamoo district, Northern Quebec, has increased its capital to \$6,000,000.00.

Another important concern has been added to the list of asbestos mining companies, namely, The Asbestos Mining and Manufacturing Co., composed chiefly of Providence (R.I.) investors, to carry on operations at Wolfstown in the Thetford district, the centre of the asbestos industry. The capacity of the plant at the start will be 150 tons of ore a day, but it is the intention to increase this subsequently to 300 tons. The build-

ings are being erected at the present time, and the plant, which is being furnished throughout by the Jenckes Machine Co., Limited, of Sherbrooke, Que., comprises: One 30x15 and two 20x6 style "B" Farrel Bacon Rock Crushers, one set 36x17 Geared Crushing Rolls, two heavy pattern Cyclone Pulverizers, one Conveying and Picking Table 32" belt 40' centres, one Steel Revolving Ore Dryer 48" diameter, 30' long, several Revolving Sizing Screens together with Bucket Elevators; all the transmission machinery required, also a pit plant consisting of Vertical Boilers, Derricks, Hoisting Engine, etc., and a very fine steam plant made up of a 14 and 26x36 Jenckes-Corliss Engine; two 150 H.P. 72" diameter x 18' long High Pressure Tubular Boilers, Condenser, Boiler Feed Pump and Feed Water Heater, all complete.

### BRITISH COLUMBIA.

Rossland.—The Spitzee Gold Mines has been reconstructed by assessing shareholders 50 cents a share, payable in two instalments of 25 cents each on the 15th of December and on the 15th of March next. It is believed this will afford ample funds for the purpose of carrying on development work and providing an adequate plant.

The Rossland *Miner*, in a recent leading article, refers to the increased activity in the mining districts of Kootenay, and specially remarks on the improvements in the situation as regards ore production. At Trail a new copper furnace, of large size, is being installed to meet new requirements, while the Dominion Copper Company in the Boundary District has already commenced smelting operations. Reference is also made to the improvement at the Hall Mines Smelter of the Marysville works, and of the building of the new zinc smelter at Frank.

Slocan.—Mr. S. S. Fowler has secured from the London and B.C. Gold Fields a lease of the White Water mine, and last month shipped about 60 tons of concentrates, averaging about 80 oz. of silver and 40% lead. Development work is to be continued during the winter.

Boundary.—Mr. A. B. W. Hodges, Superintendent of the Granby Company, has agreed, subject to the confirmation of his directors, to reduce the working day at the Grand Forks smelter to eight hours, and employ three instead of two shifts, the men on the other hand agreeing to a reduction of wages equivalent to 10%, with the exception of labourers receiving \$2.50 per day. This change will involve a large increase in the staff at the smelter, by the employment of 50 additional men, and make a difference of \$40,000.00 in the monthly pay-roll of the works.

Cariboo.—The *Inland Sentinel* publishes a short résumé of the season's work in this district, and reports that properties on China Creek had a successful run, while the Bear Company on Cunningham Creek is spoken of as likely to become one of the largest hydraulic mines in the district. During the season from 30 to 40 men were employed constructing a dip to carry water from Cunningham and Antler creeks to the property, and next spring a dam is to be built in Cunningham Pass to provide a reservoir. On the Slocan-Cariboo Gold Mining Company's property a shaft house was built last season, and a stamp plant installed, while a shaft was sunk to a depth of 60 feet. It is proposed to continue this shaft to a depth of 90 feet and then drive a distance of 200 feet to strike the channel of Canadian Creek. At Slough Creek pumping is being continued regularly at the rate of about 800 gallons per minute. On Peter's Creek a large water well installation has been made, and underground working is about to commence. Operations are also proceeding at Laird's property on Willow Creek, where a sinking is being continued, while operations are also active at Wingdam. The Cariboo Consolidated, Ltd., are continuing the bed rock drive, and it is hoped that richer ground will be encountered higher up the creek.

Coast.—The Copper Queen mine on Texada Island, which was recently reopened by Eastern investors, is now being systematically worked with a force of 40 miners. It is said that a promising new showing of ore has been opened up.

Rossland.—The suit of the Centre Star Mining Company vs. The Rossland-Kootenay Mining Company, known as the *Nickel Plate* case, has been amicably arranged.

Boundary.—Litigation in connection with the Providence mine, near Greenwood, continues to occupy the attention of the Courts, and two cases, in which judgments were given adverse to local shareholders, were recently appealed, and the decisions reversed.

At a recent meeting of the directors of the McKinley Mines, Limited, a resolution was passed granting an option on the property to Mr. J. S. C. Fraser, of Rossland, for \$200,000.00.

Slocan.—Chief Justice Hunter has given a decision in the case of the Star Mining & Milling Company v. The Slocan Star Mining Company, in favour of the defendants, dismissing the action with costs against the plaintiffs.



The present high price of lead, which has now advanced to £16, has resulted in the withdrawal of the Dominion Government bounty on lead.

**Nelson.**—It is proposed to install an additional 15 stamps at the Referendum mill. The mill at present is using five stamps only.

As a result of ten days run, at the end of November, at the Wilcox mine, a gold brick was produced valued at \$5,000.00.

**Lardeau.**—At the clean-up of the Eva mine, for October, a gold brick was produced valued at \$5,000.00, while the estimated value of the concentrates for this period was \$1,000.00.

**Rosslund.**—At a meeting of the shareholders of the White Bear Mining Company, held in Toronto on Nov. 16th. it was resolved to transfer the property and assets of the company to a trustee, prior to the formation of a new company, to be capitalized at a million dollars in 10 cent shares, shareholders in the old company to receive an equal number of shares in the new undertaking, subject to an assessment of 2 cents per share.

**Coast.**—Mr. F. O. Havey, an English engineer engaged by the directors of the Tyee Company to inspect their mines, has presented a preliminary report as follows:—

Firstly. The ore reserves cannot be safely estimated at more than 10,000 or 12,000 tons.

"Secondly. I see nothing to substantiate the assertion that ore 'has to be found' in depth. There is, of course, a possibility that such may be the case, though the conditions are not favorable.

"Explorations ought to be continued, and I shall recommend it, but with the most favorable results which may accrue from any work in this direction many months would elapse before new ore could be sufficiently developed to justify output on a proper basis, and it is therefore evident that unless the present ore body east opens out into something more than the position warrants me in estimating, the time must soon come when, for a period at least, the Tyee output will be entirely suspended. Under the circumstances, I felt justified in prolonging my visit a few days to inquire into the situation generally of the camps in the surrounding districts."

Negotiations have been in progress for the sale of the Lenora mine to an English Company, for the sum of \$100,000.00, but two actions have been brought by creditors and others in the courts to prevent the sale being made.

The Victoria *Colonist* reports the sale of a number of iron properties on the west coast of Vancouver Island, on Bugaboo Creek, to a company represented in Victoria by Mr. I. B. Atkinson, M.E., for the sum of \$150,000.00.

**East Kootenay.**—A production of 150 tons a day is being maintained on the Sullivan group of mines, while developments are being continued by diamond drilling.

The Morning Star group of claims on Duck Mountain, near Sirdar, have been obtained by a syndicate of Denver, Colorado, investors. There is said to be a good showing of zinc ore on this property.

**Cassiar.**—During the past season the Rosella Mining Company installed a hydraulic plant and constructed a ditch in readiness for the commencement of active operations early next year.

**Nelson.**—The Arizona mineral claim, adjoining the Wilcox on Wild Horse Creek of the Ymir district, has been bonded for \$12,000.00.

Mr. Gilman Brown, who recently reported on the Ymir, gives it as his opinion that the body of high grade ore lately encountered in the 500 ft. level will probably be found at greater depth without diminution of the values, he in fact expresses the opinion that the vein is a fissure, though much disturbed and broken by dykes. Meanwhile operations are being continued at the 500, 600 and 1,000 ft. levels to the west. The present values are said to yield about an average of \$15.00 per ton of the new find.

**Lardeau.**—Returns from a recent shipment of 18 tons from the Mammoth at Camborne yielded \$2,431.82, after deducting freight and treatment charges.

At the Beatrice mine much development work is in progress and an aerial tramway 300 feet long has recently been erected.

The Metropolitan Gold & Silver Mining Company last month made final payments on the purchase of the Triune and Metropolitan groups, paying for the former \$35,000.00, and for the latter \$100,000.00. The company has also repurchased the shares allotted to Messrs. Ferguson Bros. Extensive development work will be proceeded with early next spring.

**Slocan.**—It is reported that Messrs. P. Burns and W. J. Wilson have purchased the Highland mine, near Ainsworth, from the Highland (Kootenay, B.C.) Company, represented in Nelson by Mr. J. Laingstocks. The mine, which is a silver-lead property, has been in operation since 1900, and has made large shipments of ore to the Nelson smelter.

Mr. G. Houston, editor of the *Sandon Mining Standard*, in an interview with the *Nelson Daily News*, recently stated that he regarded the outlook in the Slocan as being distinctly better than it has been for some years past. He added that much development work was in progress and in contemplation, while the leasing system was coming into more general vogue.

Magnetic separation was being thoroughly tested at the Kootenay Ore Company's works at Kaslo, while the new Frank zinc works were likely to successfully compete with foreign bidders for the treatment of the zinc ores of the district.

A new strike is reported to have been made on the Slocan Star mine, a fine body of clean ore having been encountered in No. 4 level of the Silversmith.

Speaking of conditions in the region tributary to Silverton, Mr. Wm. Hunter is reported to have said that the general feeling in the camp is better than it has been for some time past, this being attributable largely to the high prices now obtainable for silver and lead. Three important mines are now being worked in the vicinity, namely, the Emily Edith, Hewitt and Wakefield, the product from which is being shipped to the Hall Mines Smelter, and averages three carloads of high grade ore weekly. Mr. Hunter expressed the opinion that Silverton and other Slocan towns had "touched rock bottom and are now on the up grade."

#### YUKON.

In speaking of mining operations in the Yukon during the past season, Mr. E. E. Blackwood, the Victoria agent of the Northern Pacific Railway Company, stated that much was expected from the operations of the recently installed dredges in the territory. The Bear Creek dredge was in operation for about two months before work was suspended on account of frost, and the average clean-up for every 24 hours, with two shifts of 7 men each, was \$4,000.00. The chief cost in the operation of dredges is the high price of fuel, but when the Klondike Mine railway is completed it will be possible to obtain coal from the Tantalus mine at a relatively low cost. The dredge at Bonanza Creek was completed too late to be operated last season, but work will be commenced early in the spring. As a result of the successful operation of the Bear Creek dredge, however, three more dredges have been ordered for working in the Yukon. These appliances are of the most modern design, and the two dredges in the territory cost respectively \$250,000.00 and \$150,000.00.

It is reported that platinum has been found in important quantities on the Little Skookum gulch, on Bonanza Creek.

#### ONTARIO.

The discovery of a large body of magnetite is reported to have been made near Eagle Lake, 20 miles south of Wabagoon.

The Temiskaming & Hudson Bay Mining Company have declared a dividend of \$2.00 per share on its capital, or the equivalent of 200 per cent.

The Lake Superior Corporation, it is said, has recently received orders for steel rails sufficient to keep the mill in continuous operation for some time to come. Among others the company has a large order from the Michigan Central Railway for one hundred pound rails, while also large orders have been received from the Canadian Pacific Railway.

The *Petrolia Advertiser* states that the Beaver Oil and Gas Company completed a well on the Roberts farm near Bothwell. This is undoubtedly one of the most important test wells drilled in the Province of Ontario during the past year. The Bothwell field has produced much oil in the past forty years, but the oil heretofore has always been produced in the shallow (Carniferous) sand. But the Beaver Oil Company's test well was dry in this formation and was drilled through the Shallow Pay to the Leamington (Clinton) sand. The Clinton Sand was encountered at a depth of 1,230 feet and at 1,250 filled up 175 feet. This find has set oil men thinking, as it was generally believed that no oil could be produced below the Carniferous sandstone.

Operations have been resumed at the Black Eagle mine, Lake of the Woods district, where it is proposed to continue sinking on the main vein.

At the Grace mine, at Eagle Lake, a 5-stamp mill is being installed.

At the Big Master mine it is proposed to increase the capacity of the mill by an additional five stamps.



It is proposed to continue extensive development work at the Redeemer mine, near Dryden, where a large force of men has been engaged to sink another shaft to a depth of 300 feet and run a tunnel 400 feet to connect with the present shaft.

The advantage of a low capitalization of mining companies is rather well instanced in the case of the Temiskaming & Hudson's Bay Mining Company, operating in the Cobalt area. This undertaking recently realized \$70,000.00 on a shipment of ore, and has thus been enabled to pay to its shareholders the substantial dividend of \$2.00 per share, or 200 per cent. on the capital of the company.

In the Manitou district there is considerable activity at the present time. Crosscutting is being carried on at the 114 ft. level in the main shaft of the Gold Rock M. & M. Company's mine. At the Big Master the stamp mill is crushing steadily, while the compressor and boiler building at the Paymaster is completed and preparations are in progress for a continuance of steady mining operations. Col. J. H. Buxton is now in charge of the Ideal, near Dryden, and is making extensive improvements to that property, where a milling plant is to be installed. At the Minnehaha Mining Company's smelting property the contract for 50 feet of work was recently completed, and samples taken from the shaft gave very high average values over \$400.00 per ton.

An Order-in-Council was passed last month reducing the area of mining claims from 40 to 20 acres. On the 28th of August last, the recording of mining claims in the four townships of Coleman, Lorraine, Bucke and Dymond, was suspended for the time being. It is now provided that these applications may be recorded on condition that the applicants become bound by any amendments and additions to the mining laws and regulations that may be made by the Legislature at its next session in regard to working conditions, taxation and all other matters whatsoever. This does not affect Cobalt Lake, Kerr Lake and the Gillies limit. No reduction is made in the area of mining locations in the townships of Lorraine, Bucke and Dymond.

#### NOVA SCOTIA.

The Boston Elevated Railway recently ordered from the Dominion Steel Company a sample shipment of rails to be used on the curves of that line. The maximum life of the curves on the Boston elevated is 43 days, and it is confidently expected that owing to their exceptional wearing qualities, the Sydney rails will show an advantage of at least 50 per cent. over those hitherto used. Meanwhile the output of the company's areas at Bell Island this season will reach the total of 400,000 tons, all of which has been brought to the company's works in Sydney. This is the largest importation for any year in the history of the company.

Mr. Lawrence Godkin has been appointed receiver of the Colonial Copper Company, owning copper mines in Nova Scotia and other portions of Canada.

The Dominion Iron & Steel Company propose increasing the capacity of the plant this winter by adding two Bessemer converters. The Company anticipate being in a position next year to make a monthly production of at least 20,000 tons of steel products.

#### COMPANY MEETINGS.

**The Big Dipper Mining Company.**—A meeting of the shareholders of this Company was held in Peterboro on the 21st November, the following directors and officers being elected:—President, Mr. J. M. Fletcher, Buffalo, N.Y.; Vice-president, Mr. J. J. Tisdale, Buffalo, N.Y.; Secretary-treasurer, Mr. J. S. Waldron, Peterboro; Superintendent, Mr. Jno. Jamieson, Myer's Cave, Ontario; Directors Mr. S. Sager of Peterboro, and Messrs. Wilson, Haywood and Bradley of Bolivar, N.Y. The company's property, which is situated in Barrie township, is turned over to the company free of all incumbrances. It is reported that very good results have been obtained from the assays made on ore from the Calumet and Hecla mines. The company is offering 50,000 shares per subscription at 25 cents per share.

**McKinley Mines, Limited.**—At the annual meeting of the company, held in November, the following directors were appointed: Mr. B. Lequime, President, and Messrs. C. R. Hamilton and A. B. McKenzie of Rossland; H. W. Worrington and D. Whiteside of Grand Forks. Mr. M. O'Brien of New York was appointed General Manager of the company.

**Young's Lake Mining Company of Ontario.**—An adjourned meeting of this company was held on the 1st of December, when it was decided to give an option on a part of the property to American investors, for \$66,000.00, under working conditions. The Company's property adjoins the Shakespeare Gold Mines near Webbwood.

**Cariboo Consolidated.**—At a meeting of this company, held in London on November 11th, a resolution to increase the capital to £200,000, at a creation of \$200,000.00, the preference shares at 2s. each, was carried unanimously.

**Granby Consolidated.**—At an extraordinary meeting, held in Boston on December 1st, resolutions were passed increasing the number of directors from twelve to fifteen, and Messrs. G. C. Clark, S. H. Steele and E. Thorne were elected members of the Board. It was also resolved to make application to the British Columbia Legislature to increase the par value of the stock from \$10.00 to \$100.00 per share. The by-laws were amended in several respects to conform with the Board's amended charter, and the directors were authorized in future to declare dividends without reference to shareholders. A dividend of 3% was declared on the capital stock of the company, payable on January 15th, out of the next earnings of the company. The books close on Dec. 19th, and are re-opened on January 16th. Shares to the number of 980,000 were represented at the meeting.

#### COAL NOTES.

**Alberta.**—The coke ovens at Coleman are in full operation and when the shaking screens are installed, No. 4 seam at the mine will, it is expected, be capable of producing 2,000 tons a day.

#### NOVA SCOTIA.

In operating between the slopes and the McGregor pit the Acadia Coal Company passed through in November another large seam of coal, of good quality, 19 feet in thickness.

The Dominion Coal Co. has recently received a number of large orders for early delivery. These include an order from the Boston & Maine Railroad for 75,000 tons; Johnston & Co., Stockholm, for 5,000 tons, while the Steel Company consumed regularly 6,000 tons per month. It is estimated that the production of the Coal Company during the first three months of next year will be in the vicinity of 800,000 tons, in order to meet the trade requirements.

Slack is in great demand at the present time and is selling at from 60 to 70 cents per ton at Pittsburg. Recent quotations, however, are: Run-of-mine at 75 cts., three-quarter screened and one-half screened at \$1.40 at the mines.

The Eastern Coal Company, with a capital of \$500,000.00, was recently incorporated to operate a coal property south of the Smith mine, at Maccan. It is proposed to equip the mines with a modern machinery plant, with the idea of producing 500 tons daily. The following gentlemen constitute the directorate of the new company:—President, Senator J. K. Kerr, K.C., of Toronto; Vice-President, Wm. Dineen, of Toronto; The Hon. Richard Harcourt, M.P.P., Toronto; Mr. Jas. B. Tudhope, M.P.P., Orillia; Mr. A. J. H. Eckhardt, Toronto; Mr. W. Munns, and Mr. A. Alfred Laurie, Treasurer.

#### MINING INCORPORATIONS.

##### ONTARIO.

**The Cambrian Mineral Company, Limited.**—Capital \$100,000.00 in shares of \$1.00 each. Head Office: Tilbury, Ontario.

**The Miramichi Quarry Co., Limited.**—Capital \$90,000.00 in shares of \$100.00 each. Head Office: Montreal, Que.

**The Silver Gulch Mining & Prospecting Company, Limited.**—Capital \$75,000.00 in shares of \$1.00 each. Head Office: Cobalt. Provisional Directors: Messrs. Louis Henry Timmins, Richard Anson Cartwright, Wm. Chas. Le Heup, Theodore John Harwood and David Alexander Dunlap.

**Cobalt-Merchants Mining Company, Limited.**—Capital \$200,000.00 in shares of \$1.00 each. Head Office: Toronto. Provisional Directors: Messrs. Hamilton Bender Wills, Robert Falconer and Whitford Vandusen.

**Cobalt Development Company, Limited.**—Capital \$1,000,000.00 in shares of \$100.00 each. Head Office: Toronto. Provisional Directors: Messrs. Thos. Henry Hamilton, Perry Lynes Hobbs, Ewan MacKenzie, Charles Magee and Geo. Stevenson.

**The Cobalt-Canadian Mining & Milling Company, Limited.**—Capital \$500,000.00 in shares of \$1.00 each. Head Office: Kingsville. Provisional Directors: Messrs. Seger Lincoln McKay, Bon Jaspersen, Geo. Jaspersen, Darius Wigle, Wm. Albert Smith and Henry James Cooper.

**The Ontario Minnesota Mining Company, Limited.**—Capital \$60,000 in shares of \$1.00 each. Head Office: Port Arthur. Provisional Directors: Josiah Davis Ensign, Geo.



Alfred Elder, Victor Stearns, Wilfrid Washington Blackshaw and Geo. Frank Piper.

Gordon Cobalt-Silver Mining Company, Limited.—Capital \$200,000.00 in shares of \$1.00 each. Head Office: Toronto. Provisional Directors: Messrs. John Francis Lennox, James Duncan Lamont, Wm. Nassau Irwin, Sidney Brown Woods, Thos. Herbert Wmox.

Margaret Mining Company, Limited.—Capital \$40,000.00 in shares of \$100.00 each. Head Office: Toronto. Provisional Directors: Messrs. Henry Martyn Chance, Alexander Fasken and Harper Armstrong.

The Annie Mining Company, Limited.—Capital \$40,000.00 in shares of \$100.00 each. Head Office: Toronto. Provisional Directors: Messrs. Henry Martyn Chance, Alexander Fasken and Harper Armstrong.

The Isa Mining Company Limited.—Capital \$40,000.00 in shares of \$100.00 each. Head Office: Toronto. Provisional Directors: Messrs. Henry Martyn Chance, Alexander Fasken and Harper Armstrong.

The Annabella Mining Company, Limited.—Capital \$40,000.00, in shares of \$100.00 each. Head Office: Toronto. Provisional Directors: Messrs. Henry Martyn Chance, Alexander Fasken and Harper Armstrong.

The Louise Mining Company, Limited.—Capital \$40,000.00 in shares of \$100.00 each. Head Office: Toronto. Directors: Messrs. Henry Martyn Chance, Alexander Fasken and Harper Armstrong.

Temagami Mining and Milling Company, Limited.—Capital \$40,000.00 in shares of \$100.00 each. Head Office: Toronto. Provisional Directors: Messrs. Chas. Lake Beckwith, Louis Oscar Hedden, Walter Eugene Thatcher, Eugene Bleything Hedden, John Blair Wilson, Frank Louis Luff, Edwin James Meeker, Robert Newell Brundage and Frederick Frelinghuysen Guild.

The Silver Five Mining Company, Limited.—Capital \$40,000.00 in shares of \$1.00 each. Head Office: New Liskeard. Provisional Directors: Messrs. James Matthews, Wesley McKnight, Donald Stewart, Walter Harold Roebuck and Henri Loudin.

Temiskamingue Reduction Works, Limited.—Capital \$166,000.00 in shares of \$100.00 each. Head Office: Village of Cobalt. Provisional Directors: Messrs. Peter Kirkegaard, Chas. Lewis Benedict and George Ritchie.

#### BRITISH COLUMBIA.

Pingree Mines, Limited.—Capital \$600,000.00 in shares of \$1.00 each.

Western Hydraulic Mining Company, Limited.—Capital \$150,000.00 in shares of \$5.00 each.

Wormwold Creek Mining Company, Limited.—Capital \$10,000.00 in shares of \$1.00 each.

#### INDUSTRIAL AND MACHINERY NOTES.

The Le Roi No. 2 company is installing a 150 H.P. electric motor, supplied by the Canadian General Electric Company.

We have received from the Westinghouse Machine Company, East Pittsburg, Pa., copies of two recently issued catalogues, namely: *Westinghouse Railway Apparatus*, and the *Westinghouse Standard Engine*. Both these catalogues are handsomely illustrated and printed. It is claimed for the Standard Engine that in points of economy it is unequalled by any other simple, non-condensing, single valve engine made.

The Denver Fire Clay Company send us a very complete catalogue of assayers' and chemists' supplies. The book contains upwards of 350 pages, and is really useful for reference purposes.

The St. Louis office of the Sullivan Machinery Company, of which Mr. P. H. Jarvis is manager, has been removed into more commodious premises in that city, in order to provide for the requirements of an increasingly large business. The new St. Louis address of the firm is now: Rooms 1125A.—1127 Missouri Trust Building.

Catalogue No. 20, issued by the Jeffrey Manufacturing Company of Columbus, Ohio, deals with the subject of *coal handling machinery*. The subject is very comprehensively discussed and profusely illustrated with diagrams and halftone blocks.

The Industrial Engineering Company of America, 32 Broadway, New York, send us particulars of a new roughing lathe, which, it is claimed, embodies in its design features far in advance of any machine now in the market, being principally designed to make the most efficient use of the new high speed steels. For use in connection with this machine two extremely efficient attachments have been devised. The machine can be built in any desired size.

The Canadian Westinghouse Company, Limited, has received an order from the Granby Company of Phoenix, B.C., for a 250 H.P. electric motor.

The Jenckes Machine Co., Limited, of Sherbrooke, Que., has recently shipped a 14"x20" Double Drum Lane Friction Winding Engine, drums 72" diameter x 36" face, to the Dominion Coal Co., Limited, Glace Bay, C.B., and is at work on a Single Drum Hoist of the same size for the same company.

The crushing plant of the American Asbestos Co. at Black Lake has been increased recently by the addition of two 40x6 Farrel Bacon style "B" Duplex Crushers of which The Jenckes Machine Co., Limited, of Sherbrooke, Que., are sole builders in Canada.

The Jenckes Machine Co., Limited, Sherbrooke, Que., has received an order from the Granby Consolidated Mining, Smelting & Power Co., Phoenix, B.C., for a 150 H.P. Double Drum Electric Hoist. The dimensions of the drums, which will be conical in shape, are 7' diameter at the larger end, 5' diameter at the smaller end and 5' long. By means of friction clutches each drum can be operated independently of the other, and both drums are also controlled by powerful brakes. The capacity of this hoist is a load of 10,000 lbs. raised at a rate of 700' a minute, and the shipping weight is in excess of 50,000 lbs.

The Nelson *Daily News* states that: "The biggest lead smelting furnace in the world is being manufactured in Nelson by the Kootenay Engineering Works. It has been ordered for the Canadian Reduction Works at Trail. Already the company has several large furnaces, probably equal or nearly equal in size to any others in use anywhere. The one now ordered from and in process of manufacture by the Kootenay Engineering Works is half as big again as the largest now in operation at Trail."

At no time, perhaps, in the history of the United States has its export trade been so great as it is at present, this being especially true in regard to high grade power machinery. The recent impetus given to the development of the far east is responsible for a considerable part of this increase, but it is also largely due to the fact that American machinery is now universally conceded to have no superior in design or workmanship. During the past two months The Westinghouse Machine Company, of East Pittsburg, Pa., has booked many orders from foreign countries. Some of the important steam engine orders follow:—One 16" and 34" x 16" Marine type vertical cross compound engine for the Kure Arsenal, Japan, four 16" and 34" x 16" Marine type and two 8½" x 8" standard steam engines for the Tehautepec Railway of Mexico, on 11" and 19" x 11" compound steam engine for the Furukawa Western Bureau, Japan, one 13½" x 12" standard steam engine for the Hokkaido Tanko Railway Company of Japan, two 10" and 18" x 10" compound steam engines for the Kuiskiui Railway of Japan, one 14" and 24" x 14" compound steam engine for the Imperial Printing Office of Japan, one 9" and 15" x 9" compound steam engine for Graham Brothers, Stockholm, Sweden, one 18" x 16" compound steam engine for the Rio de Janeiro Tramway Light & Power Company of Brazil, and one 18" x 16" standard steam engine for the Santa Cecilia Sugar Company of Cuba.

When the large Union Station at the Washington terminal of the Pennsylvania Railroad is completed, it will be one of the finest and best equipped railroad stations in the world, serving all incoming and outgoing trains of Washington. In conformity with the rest of the station the power plant will be equipped with the most up-to-date and best machinery obtainable, steam turbines being selected as prime movers partially on account of the limited amount of space devoted to that purpose. Four 500 kw. steam turbines have been ordered from The Westinghouse Machine Company, of East Pittsburg, Pa., adapted for driving alternating current 60 cycle generators running at 3,600 r.p.m. Dry saturated steam will be used at 150 pounds pressure and 25" vacuum, and the turbines will be capable of developing 670 electrical horse power each. The alternating current generators will be of the turbo rotating field type with two poles and a frequency of 7,200 alternations per minute at a normal speed of 3,600 r.p.m. They will deliver three-phase current at 2,300 volts, and, being of the enclosed type, will operate practically without noise.

The North Carolina Granite Corporation of Mt. Airy, N.C., is now installing a Sullivan Corliss, two stage air compressor for driving the Sullivan drills and other compressed air appliances, used at its quarries. This compressor has a capacity of 2,000 cu. ft. of air per minute, at 78 revolutions, and is an excellent example of modern practice in air compression, as regards fuel economy and air efficiency. The air cylinders are connected to a Sullivan Corliss, cross compound, condensing steam end, especially designed and proportioned for this purpose. The air inlet valves are of the Corliss type, operated by independent eccentrics, and the discharge valves on both cylinders are of the automatic poppet type, moving in a direction parallel with the piston rod, with removable seats located in the cylinder heads. The devices for cooling the air during compression are unusually efficient. A similar machine is installed at the works



of the Southern States Portland Cement Co., at Rockmart, Ga., and has given very efficient service during the two years that it has been in operation.

Owing to the rapidly increasing Southern business of the past year the De La Vergne Machine Company, of New York has established a branch agency at Atlanta, Ga. We understand this agency is to cover the States of North Carolina, South Carolina, Alabama, Florida and Georgia. This agency will handle business connected with the three lines of machinery manufactured by the De La Vergne Machine Company, viz.: Refrigerating and Ice Making Machinery, "Hornsby-Akroyd" oil engines and Koerting gas engines. Their representative will be Mr. W. M. Hargreaves, and the office will be located at 510 Candler Building.

Owing to the increase of business and growing importance of Montreal as a center for distribution of their products, the Robb Engineering Company has decided to change their agency at Montreal, into a branch office. Mr. Watson Jack has been appointed manager, and Mr. Alister Maclean will continue in the capacity of engineer for the Montreal district. The Robb Engineering Company will have their quarters in the handsome suite of offices occupied by Watson, Jack & Company in the Bell Telephone Building, corner of Notre Dame and St. John Street.

The interests controlling the Bedford Quarries Co., of Bedford, Indiana, and the Ohio Quarries Co., of North Amherst, Ohio, with head offices at Chicago, are planning to largely increase the output of their limestone and sandstone properties at the above points. The new equipment required at the quarries next year will include 18 Sullivan stone channeling machines, which has just been ordered through Mr. George D. Hunter, the representative of the Sullivan Machinery Co., at Bloomington, Ind. These machines are of the class "Y" rigid head type, with boiler. This channeler has been developed especially for the needs of the building stone districts, and for several years has been the standard machine in use. The two companies above named have made exhaustive tests of channeling machines, and the Sullivan type was selected on account of its superior cutting capacity, and its economy and convenience in operation. The Bedford Quarries Co. already has 10 machines of this type in use, while the Ohio Quarries Co. has eight similar machines, especially adapted for cutting sandstone at its North Amherst quarries. We illustrate one of the quarries in the Bloomington-Bedford district, showing this type of channeler and the method of operation. The Consolidated Stone Co. has also ordered four of the new class "Y" Sullivan Colitic type channelers with 8" cylinders, for use at its quarries at Bloomington and Bedford. This company will then have 21 Sullivan machines at these two properties. The New York office of the Sullivan Machinery Co., has also secured from F. A. Maselli & Co. an order for two class Y-6 channelers and several rock drills, for use at Rochester, N.Y., on the Erie Canal improvements.

## THE DEVELOPMENT OF CANADIAN-MEXICAN TRADE.

Great interest is now being taken in the development of trade between Canada and Mexico, and capitalists are looking towards that country and its resources and development with greater interest each year. Not only is Mexico attractive to the Canadian from a trade standpoint, but as is well known, it is one of the most interesting countries in the world to visit during the winter months. To give all those who contemplate a trip to this wonderful southern country, (which anyone who can afford the time and expense should do) the Grand Trunk Railway System are organizing a special excursion that will give the best opportunity to tourist and business men to cover the whole of Mexico.

This tour will leave Montreal in special Pullman sleeping cars on the morning of January 29th, connecting at Chicago with the special Pullman train that will leave there at 10.00 a.m. January 30th, proceeding south through St. Louis, San Antonio and Laredo into Mexico. The itinerary is made to include all of Mexico that is of interest to the traveller for pleasure and extending the scope and time far beyond the lines and dates of the ordinary tour, making leisurely stays here and there in the Capital and other important cities.

The tour will be under special escort and in charge of Mr. Reau Campbell, General Manager of the American Tourist Association, who is the best posted authority on Mexico in America, and who has accompanied like parties to that country every year for the past twenty-five years.

Great interest is being taken throughout the country regarding these special excursions and there is no doubt that a representative party will leave Canada for the first of these tours. Another tour is in contemplation for the latter part of February.

Literature, rates and further information is given to all by Mr. S. Quinlan, at Bonaventure Station, Montreal

## COMPANY NOTES.

**Le Roi, No. 2.**—The copper returns of this mine were as follows:—Ore shipped 680 tons; net receipts \$17,950.00, being payment for 807 tons shipped, and \$1,633.00 being payment on 57 tons of concentrate shipped, or total \$19,583.00.

**Le Roi.**—The October shipments amounted to 8225 tons—to Northport smelter 2150 tons, to Trail smelting works, 6075 tons—containing 2930 ounces of gold, 3750 ounces of silver, and 187,600 pounds of copper; estimated profit on the ore after deducting cost of smelting, mining, realization and depreciation, \$19,500; expenditure on development during the month, \$11,000.

**Cariboo Consolidated.**—An extraordinary general meeting of this company has been called for the purpose of passing resolutions to increase the capital of the Company to £220,000 by an issue of preference, additional capital being required, as the gravel so far opened is not dry enough to permit of extensive breasting operations, and it is therefore considered necessary to drive the main east tunnel some hundred feet further in, in order to keep ahead of the gravel blocked out while it is drying, and thus admit of the recovery of gold without overtaking the development work. The width of the channel at present being worked is some 160 feet. One of the directors who recently visited the property reports that the spasmodic breasting work to date has resulted in the recovery of over 450 ounces of gold under adverse conditions.

## SOCIETY MEETINGS.

### SOCIETY OF CHEMICAL INDUSTRY.

At a meeting of the Canadian section of the Society of Chemical Industry in Toronto, Mr. Nieghorn, Manager of the Canadian Chemical Company, London, announced that a company was prepared to invest \$1,500,000 in a plant to utilize the silver ores of Hastings and to extract sulphuric acid by the contact process. The works will be in the neighborhood of Tweed and will give a great stimulus to mining in Eastern Ontario. At the same meeting Prof. Lang, of Toronto University, read a paper giving the result of some of his observations during a summer trip to British Columbia. He spoke most hopefully of the future of the iron industry in that province, where ore, coal and limestone are found in close proximity. Speaking as a chemist he was much impressed with the Trail smelter, which he looked upon as a fine chemical industry. He hoped to see something done to save the platinum, osmiridium and mercury which are found in that province. J. P. Murray expressed regret that Canadian ores should have to be sent to the United States for treatment and suggested that the Federal Government should take some steps in the matter. Prof. W. G. Miller thought that the appropriation for the Geological Survey, which is the same as 25 years ago, might be increased.

## THE WAR EAGLE-CENTRE STAR AMALGAMATION.

(From a Special Correspondent).

The shareholders of War Eagle and Centre Star at their meetings in Toronto on the 23rd and 28th of November respectively, sanctioned the amalgamation of the two companies. The Centre Star Co. takes over all the assets of War Eagle, giving therefor two shares of Centre Star for three of War Eagle. The number of shares so transferred, and to be divided pro rata among the shareholders of War Eagle, is 1,166,667. The capitalization of the amalgamated companies will be \$4,666,667, of which \$3,500,000 is Centre Star. The management hope by using one shaft for the two mines, and other economies, to effect a saving of from \$25,000 to \$30,000 a year. With reference to a greater amalgamation of Rossland properties it was announced that though it had been considered nothing definite had been done. For some time War Eagle has been paying expenses but little more. Recent tests at Centre Star with the diamond drill gave encouragement. The financial year for Centre Star will henceforth close on December 31st instead of September 30th, and the annual meeting will be held on the fourth Tuesday of February instead of in November.

## MAJOR DAVID BEAMES,

Late I.S.C., and of Berkhamstead, England.

If the above will communicate with C. J. Walker's Advertising Agency, 24 Coleman Street, London, England, he may hear of something to his advantage.



# PROVINCE OF QUEBEC

The Attention of Miners and Capitalists in the United States  
and in Europe is invited to the

## Great Mineral Territory

Open for Investment in the Province of Quebec.

Gold, Silver, Copper, Iron, Asbestos, Mica, Plumbago, Phosphate,  
Chromic Iron, Galena, Etc.

Ornamental and Structural Materials in Abundant Variety.

The Mining Law gives absolute security to Title, and has been  
specially framed for the encouragement of Mining.

Mining concessions are divided into three classes:—

1. In unsurveyed territory (a) the first class contains 400 acres, (b) the second, 200 acres, and (c) the third, 100 acres.
2. In surveyed townships the three classes respectively comprise one, two and four lots.

All lands supposed to contain mines or ores belonging to the Crown may be acquired from the Commissioner of Colonization and Mines (a) as a mining concession by purchase, or (b) be occupied and worked under a mining license.

No sale of mining concessions containing more than 400 acres in superficies can be made by the Commissioner to the same person. The Governor-in-Council may, however, grant a larger extent of territory up to 1,000 acres under special circumstances.

The rates charged and to be paid in full at the time of the purchase are \$5 and \$10 per acre for mining lands containing the superior metals\*; the first named price being for lands situated more than 12 miles and the last named for lands situated less than 12 miles from the railway.

If containing the inferior metal, \$2 and \$4 according to distance from railway.

Unless stipulated to the contrary in the letters patent in concessions for the mining of superior metals, the purchaser has the right to mine for all metals found thereon; in concessions for the mining of the inferior metals, those only may be mined for.

\*The superior metals include the ores of gold, silver, lead, copper, nickel, graphite, asbestos, mica, and phosphate of lime. The words inferior metals include all other minerals and ores.

Mining lands are sold on the express condition that the purchaser shall commence bona fide to mine within two years from the date of purchase, and shall not spend less than \$500 if mining for the superior metals; and not less than \$200 if for inferior metals. In default, cancellation of sale of mining lands.

(b) Licenses may be obtained from the Commissioner on the following terms:—Application for an exploration and prospecting license, if the mine is on private land, \$2 for every 100 acres or fraction of 100; if the mine is on Crown lands (1) in surveyed territory, \$5 for every 100 acres, and (2) in unsurveyed territory, \$5 for each square mile, the license to be valid for three months and renewable. The holder of such license may afterwards purchase the mine paying the prices mentioned.

Licenses for mining are of two kinds: Private lands licenses where the mining rights belong to the Crown, and public lands licenses. These licenses are granted on payment of a fee of \$5 and an annual rental of \$1 per acre. Each license is granted for 200 acres or less, but not for more; is valid for one year, and is renewable on the same terms as those on which it was originally granted. The Governor-in-Council may at any time require the payment of the royalty in lieu of fees for a mining license and the annual rental—such royalties, unless otherwise determined by letters patent or other title from the Crown, being fixed at a rate not to exceed three per cent. of the value at the mine of the mineral extracted after deducting the cost of mining it.

The fullest information will be cheerfully given on application to

**THE MINISTER OF LANDS, MINES AND FISHERIES,**

PARLIAMENT BUILDINGS, QUEBEC.

# **Ontario's**

## **MINING**

## **LANDS**

THE Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals and extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and sulphides; zincblendes, galena, pyrites, mica, graphite, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. Recent discoveries of corundum in Eastern Ontario are believed to be the most extensive in existence.

The output of iron, copper and nickel in 1903 was much beyond that of any previous year, and large developments in these industries are now going on.

In the older parts of the Province salt, petroleum and natural gas are important products.

The mining laws of Ontario are liberal, and the prices of mineral lands low. Title by freehold or lease, on working conditions for seven years. There are no royalties.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific Railway runs through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

**HON. FRANK COCHRANE,**

Commissioner of Lands and Mines.

or

**THOS. W. GIBSON,**

Director Bureau of Mines,

**Toronto, Ontario.**





## PROVINCE OF NOVA SCOTIA.

# Leases for Mines of Gold, Silver, Coal, Iron, Copper, Lead, Tin

— AND —

## PRECIOUS STONES.

**TITLES GIVEN DIRECT FROM THE CROWN, ROYALTIES AND RENTALS MODERATE.**

### GOLD AND SILVER.

Under the provisions of Chap. 1, Acts of 1892, of Mines and Minerals, Licenses are issued for prospecting Gold and Silver for a term of twelve months. Mines of Gold and Silver are laid off in areas of 150 by 250 feet, any number of which up to one hundred can be included in one License, provided that the length of the block does not exceed twice its width. The cost is 50 cents per area. Leases of any number of areas are granted for a term of 40 years at \$2.00 per area. These leases are forfeitable if not worked, but advantage can be taken of a recent Act by which on payment of 50 cents annually for each area contained in the lease it becomes non-forfeitable if the labor be not performed.

Licenses are issued to owners of quartz crushing mills, who are required to pay Royalty on all the Gold they extract at the rate of two per cent. on smelted Gold valued at \$19 an ounce, and on smelted Gold valued at \$18 an ounce.

Applications for Licenses or Leases are receivable at the office of the Commissioner of Public Works and Mines each week day from 10 a.m. to 4 p.m., except Saturday, when the hours are from 10 to 1. Licenses are issued in the order of application according to priority. If a person discovers Gold in any part of the Province, he may stake out the boundaries of the areas he desires to obtain, and this gives him one week and twenty-four hours for every 15 miles from Halifax in which to make application at the Department for his ground.

### MINES OTHER THAN GOLD AND SILVER.

Licenses to search for eighteen months are issued, at a cost of thirty dollars, for minerals other than Gold and Silver, out of which areas can be selected for mining under lease. These leases are for four renewable terms of twenty years each. The cost for the first year is fifty dollars, and an annual rental of thirty dollars secures each lease from liability to forfeiture for non-working.

All rentals are refunded if afterwards the areas are worked and pay royalties. All titles transfers, etc., of minerals are registered by the Mines Department for a nominal fee and provision is made for lessees and licensees whereby they can acquire promptly, either by arrangement with the owner or by arbitration, all lands required for thier mining works.

The Government as a security for the payment of royalties, makes the royalties first lien on the plant and fixtures of the mine.

The unusually generous condition under which the Government of Nova Scotia grants its minerals have introduced many outside capitalists, who have always stated that the Mining laws of the Province were the best they had had experience of.

The royalties on the remaining minerals are: Copper, four cents on every unit; Lead, two cents upon every unit; Iron, five cents on every ton; Tin and Precious Stones, five per cent.; Coal, 10 cents on every ton sold.

The Gold district of the Province extends along its entire Atlantic coast, and varies in width from 10 to 40 miles, and embraces an area of over three thousand miles, and is traversed by good roads and accessible at all points by water. Coal is known in the Counties of Cumberland, Colchester, Pictou, and Antigonish, and at numerous points in the Island of Cape Breton. The ores of Iron, Copper, etc., are met at numerous points, and are being rapidly secured by miners and investors.

Copies of the Mining Law and any information can be had on application to

## THE HON. W. T. PIPES,

Commissioner Public Works and Mines,

HALIFAX, NOVA SCOTIA.



# DOMINION OF CANADA

## SYNOPSIS OF REGULATIONS

### For disposal of Minerals on Dominion Lands in Manitoba, the North-West Territories and the Yukon Territory.

#### COAL.

Coal lands may be purchased at \$10 per acre for soft coal and \$20 for anthracite. Not more than 320 acres can be acquired by one individual or company. Royalty at the rate of ten cents per ton of 2,000 pounds shall be collected on the gross output.

#### QUARTZ.

Persons of eighteen years and over and joint stock companies holding free miner's certificates may obtain entry for a mining location.

A free miner's certificate is granted for one or more years, not exceeding five, upon payment in advance of \$7.50 per annum for an individual, and from \$50 to \$100 per annum for a company, according to capital.

A free miner, having discovered mineral in place, may locate a claim 1,500 x 1,500 feet by marking out the same with two legal posts, bearing location notices, one at each end on the line of the lode or vein.

The claim shall be recorded within 15 days if located within ten miles of a mining recorder's office, one additional day allowed for every additional ten miles or fraction. The fee for recording a claim is \$5.

At least \$100 must be expended on the claim each year or paid to the mining recorder in lieu thereof. When \$500 has been expended or paid, the locator may, upon having a survey made, and upon complying with other requirements, purchase the land at \$1.00 an acre.

Permission may be granted by the Minister of the Interior to locate claims containing iron and mica, also copper, in the Yukon Territory of an area not exceeding 160 acres.

The patent for a mining location shall provide for the payment of a Royalty of 2½ per cent. of the sales of the products of the location.

#### PLACER MINING.

Manitoba and the N. W. T., excepting the Yukon Territory.—Placer mining claims generally are 100 feet square; entry fee \$5, renewable yearly. On the North Saskatchewan River claims are either bar or bench, the former being 100 feet long and extending between high and low water mark. The latter includes bar diggings, but extends back to the base of the hill or bank, but not exceeding 1,000 feet. Where steam power is used, claims 200 feet wide may be obtained.

Dredging in the rivers of Manitoba and the N. W. T., excepting the Yukon Territory.—A free miner may obtain only two leases of five miles each for a term of twenty years, renewable in the discretion of the Minister of the Interior.

The lessee's right is confined to the submerged bed or bars of the river below low water mark, and subject to the rights of all persons who have, or who may receive entries for bar diggings or bench claims, except on the Saskatchewan River, where the lessee may dredge to high water mark on each alternate leasehold.

The lessee shall have a dredge in operation within one season from the date of the lease for each five miles, but where a person or company has obtained more than one lease one dredge for each fifteen miles or fraction is sufficient. Rental, \$10 per annum for each mile of river leased. Royalty at the rate of two and a half per cent. collected on the output after it exceeds \$10,000.

Department of the Interior.

Ottawa, February, 1904.

#### DREDGING IN THE YUKON TERRITORY.

Six leases of five miles each may be granted to a free miner for a term of twenty years, also renewable.

The lessee's right is confined to the submerged bed or bars in the river below low water mark, that boundary to be fixed by its position on the 1st day of August in the year of the date of the lease.

The lessee shall have one dredge in operation within two years from the date of the lease, and one dredge for each five miles within six years from such date. Rental, \$100 per mile for first year and \$10 per mile for each subsequent year. Royalty, same as placer mining.

#### PLACER MINING IN THE YUKON TERRITORY.

Creek, gulch, river and hill claims shall not exceed 250 feet in length, measured on the base line or general direction of the creek or gulch, the width being from 1,000 to 2,000 feet. All other placer claims shall be 250 feet square.

Claims are marked by two legal posts, one at each end, bearing notices. Entry must be made within ten days, if the claim is within ten miles of mining recorder's office. One extra day allowed for each additional ten miles or fraction.

The person or company staking a claim must hold a free miner's certificate.

The discoverer of a new mine is entitled to a claim of 1,000 feet in length, and if the party consists of two, 1,500 feet altogether, on the output of which no royalty shall be charged, the rest of the party ordinary claims only.

Entry fee, \$10. Royalty at the rate of two and one-half per cent. on the value of the gold shipped from the Yukon Territory to be paid to the Comptroller.

No free miner shall receive a grant of more than one mining claim on each separate river, creek or gulch, but the same miner may hold any number of claims by purchase, and free miners may work their claims in partnership by filing notice and paying fee of \$2. A claim may be abandoned, and another obtained on the same creek, gulch or river, by giving notice and paying a fee.

Work must be done on a claim each year to the value of at least \$2200.

A certificate that work has been done must be obtained each year; if not, the claim shall be deemed to be abandoned, and open to occupation and entry by a free miner.

The boundaries of a claim may be defined absolutely by having a survey made and publishing notices in the Yukon Official Gazette.

#### PETROLEUM.

All unappropriated Dominion Lands in Manitoba, the North-West Territories and within the Yukon Territory are open to prospecting for petroleum, and the Minister may reserve for an individual or company having machinery on the land to be prospected, an area of 640 acres. Should the prospector discover oil in paying quantities, and satisfactorily establish such discovery, an area not exceeding 640 acres, including the oil well and such other land as may be determined will be sold to the discoverer at the rate of \$1.00 an acre subject to royalty at such rate as may be specified by order-in-council.

**W. W. CORY,**

Deputy of the Minister of the Interior.



# DEEP DRILLING

makes economical mining and the deepest hole can be drilled at the smallest cost by a

## DIAMOND ROCK DRILL

It can cut through 2,500 feet of solid rock in a vertical line. It brings up solid cylinders of rock, showing formation and character.

Made in all capacities, for Hand or Horsepower, Steam or Compressed Air—mounted or unmounted.

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### American Diamond Rock Drill Company

95 Liberty Street, NEW YORK CITY, U.S.A.

Cable Address, "Occiduou," New York.

# HADFIELD'S STEEL FOUNDRY CO. LIMITED. SHEFFIELD

## Heclon Rock and Ore Breaker

HADFIELD AND JACK'S PATENT

The only Perfect Gyratory Stone-Crusher

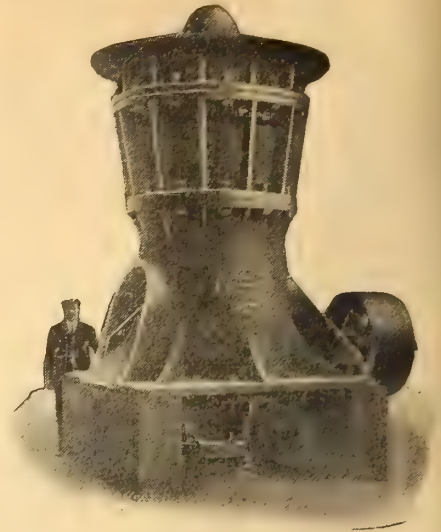
THE PARTS THAT ARE SUBJECT TO EXCESSIVE WEAR ARE MADE OF

Hadfield's Patent "Era" Manganese Steel

WE MANUFACTURE JAW BREAKERS, CRUSHING ROLLS,  
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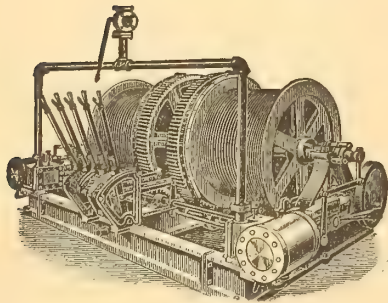
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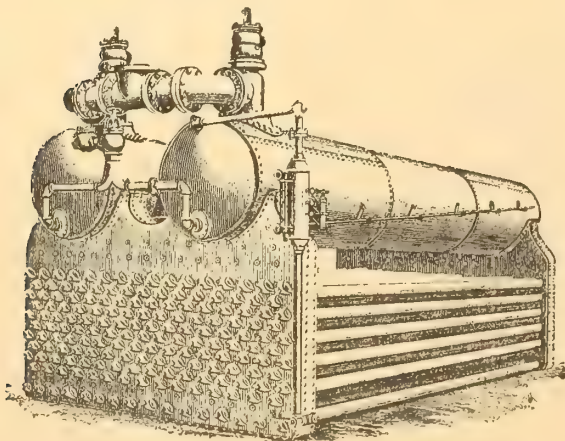
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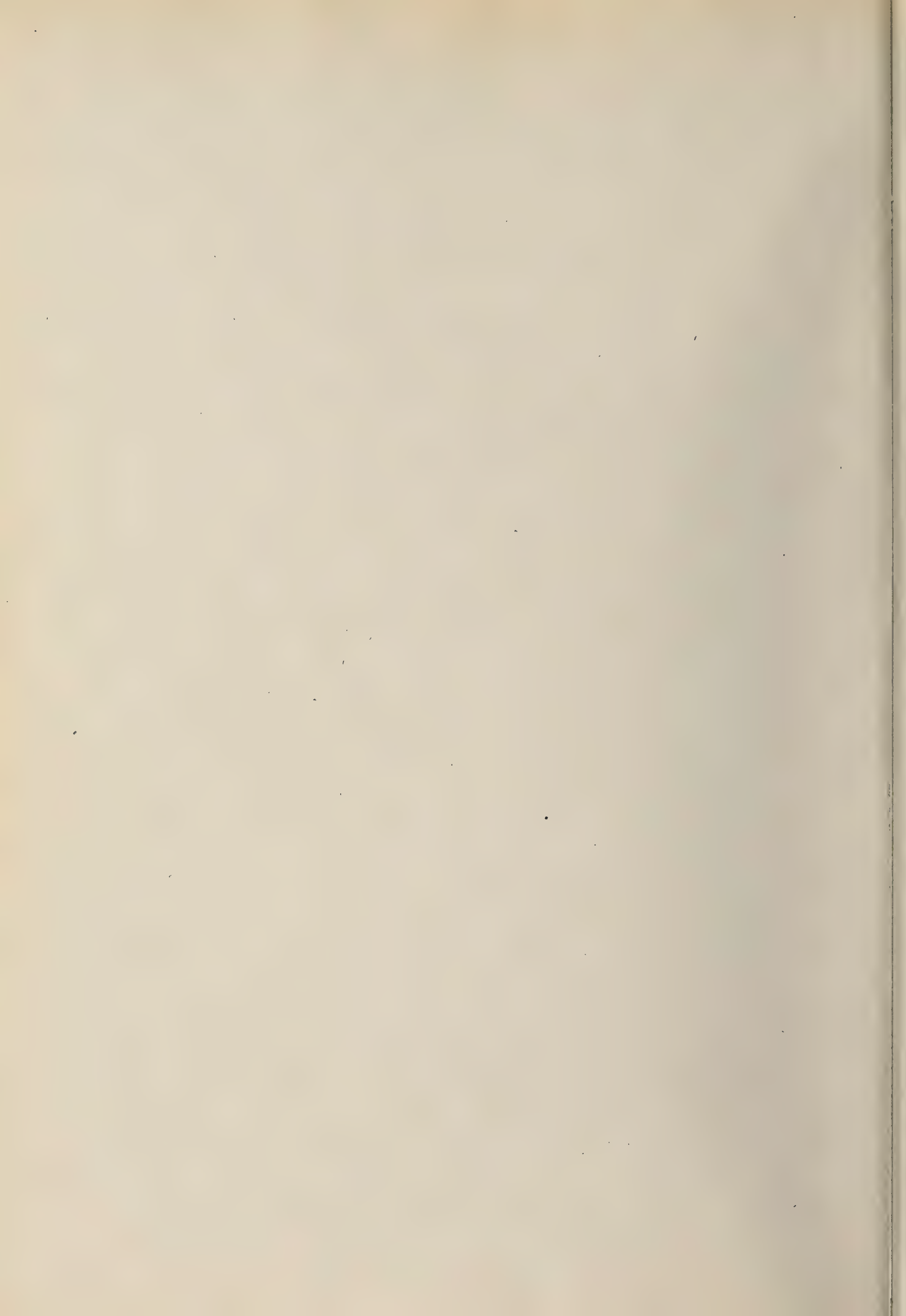
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